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# Debt Management by Companies Entering the Unlisted Securities Market

**R. Buckland, E. W. Davis and K. A. Yeomans***

**Abstract**—Using data drawn from the quotation of firms on UK secondary equity markets between November 1980 and March 1985, the paper examines the debt position and debt behaviour of such crucial firms at this critical point in their existence. It is concluded that newly-quoted firms are financially imbalanced at their quotation, but that this is only weakly related to their size, industry, growth, riskiness and yields. Clear evidence exists that entrants move towards target debt ratios, but these targets are again only poorly related to characteristics of firms suggested by the finance literature to be of importance in capital structure decisions.

## Introduction

The financing problem of small and sometimes of high growth firms was articulated as early as 1931 and constitutes the original 'Macmillan Gap' (Macmillan, 1931). The capital constraint experienced by such enterprises was pursued subsequently by the Radcliffe (1959), Bolton (1971) and Wilson (1980) Committees in the UK.

The development of new equity capital markets in the 1970s and 1980s has reflected various governmental and institutional concerns that small and growing businesses were being denied access to quotation and the resultant access to the high volume equity and debt markets available to quoted businesses.

In this paper the financial behaviour of new entrants to the Unlisted Securities Market (USM) and the Official List (OL) in the UK, from 1980–85, is examined and contrasted to identify whether such firms are characterised by financing 'gaps', by accumulated financing pressures and whether they utilised their access to secondary markets in reviewing or revising their financial structures subsequent to entry.

## Financial structure literature

The decision to seek quoted status not only provides the smaller firm with access to sources of equity and debt capital previously denied to it, but also improves its credit worthiness and financial standing and enables it to restructure its whole financial base to achieve 'target' financial policy levels.

The contemporary finance literature on the issue of company financial structure offers a choice of paradigms. For thirty years the agenda for the debate over financial structure has been dominated by Modigliani and Miller's (1958) irrelevance hypothesis, suggesting that in equilibrium the financial structure of the firm has no impact upon shareholders' wealth. Challenging that hypothesis are the proponents of 'frictional' theories of company leverage, who argue that some 'optimal' gearing level exists, determined by the exploitation of corporate tax shelters or by bankruptcy costs (see, e.g., Baxter, 1967).

This inconclusive debate has been revitalised in recent years by the analysis of disequilibrium and behavioural models of financial structure. Notable among these models are those based upon the asymmetries of information possessed by 'insiders' (managers, or existing owners of businesses) in contrast to that available to 'outsider' investors and lenders. When it is recognised that such asymmetric access to, and quality of, information and expectations exists, then the nature of the contractual, agency relationship between manager and investor becomes of vital interest (see, for example, Grossman and Hart, 1982; or Blazenko, 1987). Moreover, managers, in choosing a particular financial structure for the business, may be thought to be guided not by first-best wealth maximising principles on the lines of Modigliani and Miller's arguments, but along second-best principles within which the level of corporate gearing is regarded as one element of a package of signals from manager-insiders to investor-outsiders (see, for example, Leland and Pyle, 1977; Miller and Rock, 1985; John, 1987; or Franke, 1987).

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*R. Buckland is lecturer in finance and E. W. Davis is Lloyds Bank professor of business finance at the Aston Business School, Aston University. K. A. Yeomans is professor of business administration at the Graduate School of Business, University of the Witwatersrand, Johannesburg. The authors acknowledge the assistance of support from the Economic and Social Research Council under grant no. F00232224, and the comments of anonymous referees.

In such a transactions cost, agency relationship and signalling view of the firm, the debt behaviour of new entrants to equity markets becomes of great importance. Theoretically, the choice of debt ratio acquires a role of signalling management's confidence and expectations to the less well informed, outsider providers of finance. Empirically, the debt ratios taken up by firms have been related to their size, industry, riskiness and asset composition (see, for example in the UK, Brealey *et al.*, 1976; or Briscoe and Hawke, 1976).

In the key UK study Marsh (1982) analysed the issuing behaviour of UK firms and showed that, when raising new funds, firms appear to be oriented to target levels of the debt:equity ratio, with these targets related to size, bankruptcy risk and the firms' asset composition (*ibid*, p. 121). His evidence is less equivocal than earlier, similar studies on US data, notably that of Taub (1975), where the sophisticated econometric techniques failed to produce substantively or statistically significant results (*ibid*, p. 415).

A new perspective on the financial structures of rapidly growing small businesses has recently been provided by Hutchinson *et al.* (1988). Their evidence from a small sample of USM entrants suggests that 'the growth small firms' are characterised by 'their high gearing and low liquidity which are indicative of the financial stress of growth' (*ibid*, p. 17).

It is known, of course, from previous studies of new equity issue markets that entrants' financial structures are one common trigger for entry. The studies of Davis *et al.* (1974) and Vaughan *et al.* (1977) showed this to be true for entrants to the UK's OL. Small scale studies of the USM entrants have identified it as a continuing concern (see, e.g., Bradley-Jones and Hussey, 1985).

## Research questions

In this paper the entry of firms to UK secondary markets is studied to determine:

(a) whether in general firms display the regressions to 'target' levels of gearing posited in the literature;

(b) whether in particular those making new money issues display such a regression to 'target' debt levels;

(c) whether such 'targets' are associated with the size, industry and other features of the business;

(d) whether the 'target' is related to the achievement of lower gearing levels, as generally postulated, or to a higher gearing level than was possible with their pre-entry unquoted company status;

(e) whether a correspondence exists between debt positions at entry, expressed prospectus intentions at entry and post-entry actual behaviour.

## Data and methodology

The research is based upon a cross-sectional study of all entrants to the UK new equity issue markets (USM and OL) from the inception of the USM in November 1980 until a sampling cut-off date at the end of March 1985. This generates a sample for which information is available upon entrants' financial characteristics and history (as recorded in an audited prospectus at the time of issue) and upon their financial activity for the subsequent three years (drawn from the Extel company cards services for USM and OL quoted companies).

In analysing the financial structure of firms it is necessary to be clear as to the measurement of gearing. In the ideal, one would wish to relate the market values of various financing assets to each other: that is the basis of the debt:equity gearing ratio of the finance literature. In terms of new equity issues, however, there are substantial drawbacks to that measure. It is unobservable in the issue prospectus, prior to any objective market evaluation of the traded equity. Also this summary measure may not capture significant shifts in or patterns of the various elements within the category of debt. Thus, one may be interested in the hypothesis that unquoted businesses are pressured into burdens of relatively short-term debt rather than institutional term lending; or quotation might be hypothesised to permit significant restructuring within unchanged global totals of debt.

There are also active debates about the place and measurement of working capital within financial structure; questions concerning the inclusion of all trade debt, or the netting off of the firm's working capital position, before measuring debt in relation to net assets employed (or, indeed, in relation to shareholders' funds). There is no universally correct approach to measurement of the debt ratio. Here the levels of and movements in various short-term and long-term components of corporate debt are explored; and we relate them to the image of the typical 'small' firm and the typical 'large' firm constructed by previous research and by the longstanding presentation in ***Business Monitor MA3*** (DTI, annually).

In our overall measure of entrants' gearing, financial structure is proxied by calculation of the ratio of total company indebtedness to the book value of capital employed. We chose this in preference to measures calculated using only long-term debt, or only short-term debt, since those disaggregated measures are both structurally related to company size and because the term structure of debt is likely to change systematically over a period of new quotation. Book values are adopted in line with the consideration that, at the time of first quotation, market values of financing assets are unobservable; and that book value measures are closer to the information conveyed in company accounts and used by managers (Marsh, 1982, p. 131). This gearing ratio was recalculated for intervals of 12, 24 and 36 months after quotation commenced, to identify movements in financial structure subsequent to quotation.

Other major variables employed in the analysis are as follows. The industrial classification of the entrant, identified by its SICC classification, is used to produce the industrial categories of Distribution and Miscellaneous Services, Communications and Leisure Industry, Manufacturing, Electronics and Industrial Process Industry, Minerals Exploration and Energy, and Management Services.

Firm size was proxied by the total book value of assets at the time of issue (avoiding the biases inherent in alternatives such as turnover, net assets, capitalisation, employees, or value added). The scale of the issue was measured by the proportion of equity being marketed (if any share sale was taking place). The level of risk of the firm and of the issue was measured by the variability of its past earnings as recorded in the prospectus profits history, by the proportion of 'new' money raised by the business during the sale, and by the market-related estimators of the equity's beta and specific risk, generated by the London Business School following quotation. Company profitability was measured retrospectively, in the reported profit and yields of the prospectus, and also prospectively, by any forecast profits and yields to which the prospectus commits the firm. The entrant's Price:Earnings Ratio was measured at the issue price, when it was given in a prospectus. For Introductions, of course, this information was not available and prospectuses rarely offer any forecast of yields upon which a P:E could be constructed.

By the inclusion of both USM and OL entrants, this sample allows analysis of the USM firms to be compared with a control sample of Official List entrants. There is, on the other hand, no control for or consideration of firms which do not enter the

**Table 1**
**Financial structure, by market status; and UK sectoral financial structure, 1980–1985**

*A. New equity market entrants, 1980—March 1985*

| | USM entrant | From OTC or 163 | OL entrant | USM transfer | Row total | F ratio | K-W chi square |
|---|---|---|---|---|---|---|---|
| Total debt | 56.43 | 34.54 | 56.43 | 47.88 | 54.17 | 12.78** | 29.23** |
| | 293 | 32 | 80 | 34 | 439 | | |
| | 21.12 | 22.39 | 15.76 | 18.54 | 20.96 | | |
| Long-term | 6.89 | 7.51 | 5.97 | 6.60 | 6.75 | 0.16 | 0.38 |
| | 294 | 32 | 78 | 33 | 437 | | |
| | 13.20 | 13.10 | 9.94 | 9.58 | 12.44 | | |
| Overdrafts | 8.90 | 7.52 | 9.05 | 4.72 | 8.51 | 1.77 | 5.96 |
| | 281 | 23 | 75 | 33 | 412 | | |
| | 10.85 | 7.34 | 9.87 | 7.58 | 10.29 | | |
| Creditors, accruals | 26.94 | 16.00 | 26.77 | 21.35 | 25.76 | 4.83** | 14.72** |
| | 284 | 27 | 76 | 33 | 420 | | |
| | 16.63 | 12.33 | 15.27 | 13.87 | 15.95 | | |
| Debt:equity | 0.50 | 0.65 | 0.64 | 0.43 | 0.53 | 0.32 | 9.82* |
| | 292 | 32 | 79 | 33 | 436 | | |
| | 1.57 | 1.05 | 1.03 | 0.67 | 1.40 | | |

*B. Sectoral financial ratios, average percentage, 1980–1985*

| | Small and medium companies | Large companies |
|---|---|---|
| Total debt | 65.44 | 56.97 |
| Long-term bank debt | 1.60 | 5.40 |
| Short-term bank debt | 16.22 | 11.44 |
| Creditors, accruals | 41.66 | 26.64 |

*Notes*:

*A*. Figures are mean (percentage of total assets except debt:equity ratio in A), no. of firms, standard deviation. F and Chi square significant at $p < 0.05$ marked*; $p < 0.01$ marked**.

*B*. 'Small' is under £100,000 total assets, 'large' over £4.16m.
1980–82 for small and medium category, not separately reported after 1982.
*Source for B: Business Monitor MA3: Company Finance*, annually, HMSO.

**Table 2**
**Mean gearing level (borrowing as percentage total assets) by entry status and declared repayment motive**

| *Mean* (%)<br>*No. of firms*<br>*SD* | *Yes* | *No* | *Row total* |
|---|---|---|---|
| USM entrant | 63.87<br>51<br>17.09 | 54.86<br>242<br>21.58 | 56.43<br>293<br>21.12 |
| From OTC or 163 | —<br>— | 34.54<br>32<br>22.39 | 34.54<br>32<br>22.39 |
| OL entrant | 56.75<br>16<br>14.19 | 56.36<br>64<br>16.24 | 56.44<br>80<br>15.76 |
| USM transfer | —<br>— | 47.88<br>34<br>18.54 | 47.88<br>34<br>18.54 |
| Column total | 62.17<br>67<br>16.62 | 52.73<br>372<br>21.35 | 54.17<br>439<br>20.96 |

Chi square = 14.65 with 3 degrees of freedom, significance = 0.002.

markets (for one study which attempts elements of such a comparison, although with a substantially smaller sample, see Hutchinson *et al.*, 1988).

Following the earlier new issues market studies (for example, Davis *et al.*, 1974; Vaughan *et al.*, 1977), the analysis proceeds by investigation of the characteristics of these issuing firms, their behaviour and the links between that behaviour and their financial structures.

## The evidence concerning debt levels, motives for entry and debt behaviour

The financial structures of entrants are summarised in Table 1, with an accompanying comparison of contemporary sectoral structure from the statistics in *Business Monitor MA3*. There is little if any evidence here that newly-quoted firms were in general over borrowed or financially stretched. Average gearing ratios are in line with the levels for large UK companies in this period; when compared with the 'small and intermediate' size firms, entrants showed lower average debt ratios and less reliance on creditor or short-term bank finance.

Differences between categories of entrant are somewhat more important. While Table 1 shows USM and OL entrants to be very similar in their average financial structure, those firms transferring between quoted markets were typically lower geared, particularly in respect of their trade credit position. This may reflect an industry bias, with a relatively large proportion of low debt oils and minerals businesses being introduced to the USM in 1980/81 and then later transferring to the OL. It may, on the other hand, reflect unquoted entrants' desire to lower their gearing by share sales at entry.

When prospectus debt levels were grouped by the method of issue, the influence of gearing on the sale of shares was confirmed. There were significant differences between introductions and all other new entrants (42.57% compared with 53.45% for total debt; 18.66% compared with 27.88% for creditors and accruals). Again, this must be viewed in the context of the numbers of oils and minerals businesses which were using the Introduction route to their quotation.

The clearest evidence of entrants' purpose in using entry to make adjustments to their financial structures is contained in prospectus motives for entry and in their opening gearing positions. Table 2 summarises the relationship between gearing levels at entry and the motive given for joining the exchange. Here firms were categorised as to whether they expressly set out in their prospectus that their motives included that of repaying outstanding corporate borrowing. It can be seen from Table 2 that roughly one in six new entrants cited debt repayment as one motive for entry. This constitutes some initial, crude evidence that quotations are being effected in order to aid in the correction of over-extended corporate borrowing. This proportion is very little different ($p > 0.05$) as between the two markets of the (old) OL (20%) and the (new) USM (17.4%).

**Table 3**
**First year change in gearing by repayment motive**

| | *Repayment promised* | *No repayment stated* | *Total* | *F* | *p* |
|---|---|---|---|---|---|
| USM | – 18.45 | – 5.25 | – 7.50 | 14.55 | 0.0002 |
| | 49 | 227 | 276 | | |
| | 22.49 | 21.34 | 22.49 | | |
| OL | – 16.76 | – 8.72 | – 10.41 | 3.08 | 0.0835 |
| | 16 | 60 | 76 | | |
| | 22.32 | 16.94 | 16.52 | | |
| Total | – 18.03 | – 4.82 | – 6.90 | 23.65 | 0.0000 |
| (Including OTC, 163 | 65 | 347 | 412 | | |
| & USM transfers) | 22.32 | 19.67 | 20.66 | | |

The gearing measures confirm that, on average, the entrants which express their intent to repay borrowing were very significantly ($p < 0.001$) more highly-geared upon entry than are other entrants. Where companies cited debt repayment as a motive, average gearing was some 10% of capital employed higher than otherwise. However the USM picture is quite different from that for OL companies.

The average level of gearing for both groups was almost identical (56.43% USM and 56.44% OL), but those USM entrants expressing an intention to repay borrowing had a gearing level which is 9% higher than those without this motive. In the OL group no such difference was revealed. The prime sources of this differential were found, as would be expected, in the sharply higher prospectus levels of both long and short-term bank debt carried by these USM businesses. In the USM, for firms predicting repayment of loans, an average of 10.68% of assets were financed by long-term debt, compared to 6.26% elsewhere. The average bank overdraft figures were 13.14% and 7.96% respectively.

Nevertheless when the reduction in gearing levels is examined in Table 3 it is clear that in all cases there are markedly different results for companies expressing the intention to repay borrowing. Gearing fell by 18% for the 65 companies in this category while for the remainder the reduction was only some 5%. The pattern was more pronounced and more statistically significant for USM companies than for OL entrants, which might be expected given the initial gearing levels noted in Table 2. This point notwithstanding, the OL firms expressing an intention to reduce borrowing exhibited twice the reduction in gearing (16.76%) compared with those without this stated motive (8.72%).

If we examine the gearing levels of entrants in more detail it is clear that there was some considerable variation in the levels of borrowing. This variability was more marked for the USM firms than for the Official List entrants. Table 1 showed that the spread of gearing levels within prospectuses was wide, particularly in the USM, and it was, in the case of high gearing levels, closely related to the explicit motivation for entry. There was also a strikingly high variability in the movement in gearing ratios, particularly, again, for the USM firms. Indeed, when we examined the behaviour of entrants which cited repayment of loans as a motive for entry, considerable anomalies were uncovered. Of the 51 USM firms which gave repayment as a motive for entry, ten proceeded to increase their gearing ratios after entry; 13 actually increased the absolute levels of their formal borrowing over the first year of quotation. The contrast between this group showing contradictory motive and behaviour; and those entrants with consistent repayment intent is very clear: the first group showed an average increase in gearing of 6% over the year, while the latter displayed an average fall of 22%.

Table 4 shows the extent to which this group was anomalous in its behaviour. While predicting repayment of debts, these ten USM entrants recorded levels of gearing indistinguishable from the average, as opposed to the relatively high levels within the group which displayed consistent behaviour. In the period subsequent to entry the ten entrants increased their average gearing to levels which are significantly higher after one year than those of the other firms. The ten firms actually substantially increased their borrowing levels, despite their express contrary intent.

Tables 5 and 6 also provide evidence to support the general financial restructuring hypothesis. Here opening gearing has been categorised into four sub-ranges, namely under 35%, 35–50%, 50–65% and 65% and over. The mean level of gearing was then calculated for companies in each of these opening positions at issue and in each of the first three years after issue. What emerges is that, for both the USM and OL groups, companies initially in the highest gearing category reduced their average gearing level quite dramatically (USM by

**Table 4**
**Contradictory debt behaviour by firms with declared debt repayment motive for entry**

| | *Opening gearing* | *Next gearing* | *Difference in gearing* | *Change in borrowing*[a] | *Opening gearing* | *Next gearing* | *Difference in gearing* | *Change in borrowing* |
|---|---|---|---|---|---|---|---|---|
| Inconsistent | 51.77 | 57.99 | 6.22 | 577.70 | | | | |
| | 10 | 10 | 10 | 10 | — | — | — | — |
| | 15.30 | 16.80 | 6.90 | 897.48 | | | | |
| Consistent | 67.17 | 42.40 | −24.77 | −302.18 | 56.75 | 39.99 | −16.76 | 1181.41 |
| | 39 | 39 | 39 | 34 | 16 | 16 | 16 | 15 |
| | 16.61 | 18.97 | 23.45 | 1663.42 | 14.19 | 12.48 | 13.48 | 11449.19 |
| No repay motive | 52.54 | 47.89 | −4.62 | 475.00 | 53.42 | 48.06 | −5.35 | 1586.89 |
| | 276 | 253 | 253 | 235 | 98 | 97 | 94 | 90 |
| | 22.53 | 19.24 | 20.85 | 2301.37 | 17.45 | 18.15 | 16.19 | 17077.04 |
| Column total | 54.27 | 47.52 | −6.86 | 383.94 | 53.89 | 46.92 | −7.01 | 1528.96 |
| | 325 | 302 | 302 | 279 | 114 | 113 | 110 | 105 |
| | 22.20 | 19.14 | 22.06 | 2208.73 | 17.02 | 17.64 | 16.28 | 16347.18 |
| F ratio | 7.81** | 2.94 | 17.69** | 1.89 | 0.53 | 2.92 | 7.09** | 0.01 |
| K-W chi square | 16.87** | 5.07 | 44.91** | 15.00** | 0.40 | 4.10* | 9.11** | 3.58 |

*Notes*: Figures are mean (percentages, except change in borrowing, which is £000), no. of firms, standard deviation. Notes to significance tests as Table 1.

[a]Change in total bank borrowing from issue to plus 12 months.

16.25% and OL by 13.80%) over the three year period. At the other extreme companies initially in the lowest gearing category increased their gearing ratio on average (by 17.82% for USM companies and 10.12% for OL entrants). The pattern was also revealed, to appropriately decreasing degrees, for the remaining two opening gearing categories. An important difference between USM and OL firms is, however, shown by Tables 5 and 6. A regression to a mean level of gearing was quite pronounced for the USM group. Three years after issue the mean levels of gearing here were between 37.98% and 59.96% irrespective of the opening position (where mean values ranged from 20.19% to 76.21%).

While such a regression to the mean also occurred for OL entrants it was less marked, so that after 3 years of post-issue trading the means ranged

**Table 5**
**Mean gearing levels at issue and up to 3 years after issue by opening gearing category—USM entrants**

| *% Opening gearing (x)* | | *Opening* | *Year 1* | *Year 2* | *Year 3* |
|---|---|---|---|---|---|
| x < 35 | Mean | 20.19 | 29.83 | 33.86 | 37.98 |
| | n | 63 | 57 | 54 | 41 |
| | SD | 11.06 | 18.89 | 20.91 | 17.99 |
| 35 < x < 50 | Mean | 43.03 | 42.37 | 47.64 | 52.12 |
| | n | 58 | 56 | 51 | 36 |
| | SD | 4.29 | 12.81 | 17.56 | 17.94 |
| 50 < x < 65 | Mean | 57.99 | 53.06 | 53.84 | 55.32 |
| | n | 92 | 84 | 70 | 60 |
| | SD | 4.56 | 12.70 | 15.92 | 19.58 |
| x > 65 | Mean | 76.21 | 55.42 | 58.97 | 59.96 |
| | n | 112 | 105 | 80 | 56 |
| | SD | 10.99 | 19.81 | 19.29 | 21.39 |
| Total | Mean | 54.27 | 47.52 | 49.98 | 52.39 |
| | n | 325 | 302 | 255 | 193 |
| | SD | 22.20 | 19.26 | 20.55 | 20.95 |

**Table 6**
**Mean gearing levels at issue and up to 3 years after issue by opening gearing category—OL entrants**

| *% Opening gearing (x)* | | *Opening* | *Year 1* | *Year 2* | *Year 3* |
|---|---|---|---|---|---|
| $x < 35$ | Mean | 25.02 | 25.51 | 33.68 | 35.14 |
| | n | 15 | 15 | 13 | 10 |
| | SD | 9.40 | 12.21 | 16.25 | 14.38 |
| $35 < x < 50$ | Mean | 43.55 | 42.08 | 45.49 | 48.35 |
| | n | 30 | 30 | 30 | 25 |
| | SD | 4.13 | 12.43 | 10.82 | 14.53 |
| $50 < x < 65$ | Mean | 57.00 | 49.03 | 48.67 | 47.99 |
| | n | 40 | 37 | 35 | 29 |
| | SD | 4.70 | 15.67 | 12.67 | 12.80 |
| $x > 65$ | Mean | 75.22 | 60.22 | 60.94 | 62.42 |
| | n | 29 | 28 | 27 | 20 |
| | SD | 5.48 | 15.59 | 16.71 | 17.28 |
| Total | Mean | 53.89 | 46.78 | 49.06 | 50.00 |
| | n | 114 | 110 | 105 | 84 |
| | SD | 17.01 | 17.83 | 15.98 | 16.52 |

**Table 7**
**Mean gearing changes between issue and year 1 by opening gearing category**

| | | *USM* | | *OL* | |
|---|---|---|---|---|---|
| *% Opening gearing (x)* | | *Difference* $x1 - x0$ | *Ratio* $x1/x0 * 100$ | *Difference* $x1 - x0$ | *Ratio* $x1/x0 * 100$ |
| $x < 35$ | Mean | 9.71 | 553.84 | 0.49 | 127.07 |
| | n | 57 | 57 | 15 | 15 |
| | SD | 18.97 | 736.09 | 15.73 | 106.77 |
| $35 < x < 50$ | Mean | −0.48 | 99.43 | −1.47 | 96.81 |
| | n | 56 | 56 | 30 | 30 |
| | SD | 12.97 | 29.55 | 12.01 | 28.53 |
| $50 < x < 65$ | Mean | −5.19 | 91.34 | −8.25 | 86.25 |
| | n | 84 | 84 | 37 | 37 |
| | SD | 12.67 | 21.65 | 16.44 | 29.53 |
| $x > 65$ | Mean | −20.59 | 74.73 | −15.34 | 80.21 |
| | n | 105 | 105 | 28 | 28 |
| | SD | 25.16 | 27.13 | 16.13 | 22.16 |
| Total | Mean | −6.86 | 173.10 | −7.01 | 93.16 |
| | n | 302 | 302 | 110 | 110 |
| | SD | 22.06 | 765.80 | 16.28 | 48.08 |

**Table 8**
**The relationship between opening gearing and new money raised**

| | *% Opening gearing (x)* | | |
|---|---|---|---|
| *% New money* (y) | $x < 65$ | $x > 65$ | *Total* |
| $y = 0$ | 51 (77.27%) | 15 (22.73%) | 66 |
| $0 < y < 30$ | 49 (70%) | 21 (30%) | 70 |
| $y > 30$ | 102 (55.43%) | 82 (44.51%) | 184 |
| Total | 202 | 118 | 320 |

Chi square = 11.77, with 2 degrees of freedom, significance = 0.0028.

from 35.14% to 62.42% compared with the initial 25.02% to 75.22% spread. The inference may be drawn that restructuring was a more important motive in seeking quoted status for companies in the smaller size group characterised by the USM than for those employing the more traditional OL route. Table 7 details more precisely the change in gearing (both as differences and percentages) over the first year following issue and confirms the trends observable in Tables 5 and 6. It also demonstrates that certain companies in the USM group sought quotation with very low gearing levels and increased these relatively by large amounts. A mean increase in gearing of 454% for those companies with an initial gearing of not less than 35% reflects this situation.

The proposition that entrants are being propelled into quoted status by the need to correct financial structure imbalance is supported by a consideration of entrants' raising of new equity capital at the time of quotation: the 'new money' raised within the issue.[1] When the new money content of USM issues was examined there was ample evidence of a greater recourse to the markets for increased equity. The average issue on to the USM included 44% new money, significantly higher than the 34% for the contemporaneous OL and in contrast to the historical pattern where new issues were predominantly composed of 'old', existing shares (Davis *et al.*, 1974, p. 45). These links between the market's quotation and money-raising characteristics lead further into the ways by which the USM may have changed firms' ability to reform their financial structure. Both the Wilson Committee and the Stock Exchange saw it as a solution for entrants to improve their access to new equity. This represents the opposite pole of the financing gap from the debt raising capacity. Table 8 indicates the extent to which firms with high levels of gearing at quotation were associated with corrective, new money issues. For the 184 firms where issues included over 30% new money, 82 (44.6%) had gearing levels above 65%; of the 66 firms where no new money was raised during an introductory share sale, 51 (77.3%) had gearing levels below 65%.

## The size relationship

There should be significant associations between entrants' size and their gearing if the hypotheses of financing gaps and of gap closure at entry are to have any validity. Table 9 examines how the dimensions of entrants' financing were linked to their prospectus total assets.

Recognising that the size distributions of the USM and OL samples overlap, the table separates entrants accordingly. It shows how size was associated with gearing at entry, and how size may be linked to the firms' behaviour following entry, proxied here by the difference between debt:asset ratios at prospectus and after 12 months of quotation. There is some evidence, though not strong evidence, that gearing and creditors and accruals were linked to size. If total assets are split at £7.5 million then the average gearing levels are as shown in Table 10.

In both cases the mean gearing was higher for the smaller companies than for those in the higher size category. While the differences were not significant ($p > 0.05$) there is a consistency in these results to support, weakly, a systematic size influence. Overall, however, Table 9 suggests that there were no simple links from entrant size to financial structure, but that the typical entrant made substantial reductions in overall debt:asset ratios after gaining quotation.

It should be noted, however, that the picture was less straightforward when alternative measures of gearing were introduced. If one considers that managers, shareholders, and lenders use the equity capitalisation of a quoted firm, rather than the written-down historical cost of net tangible assets, as a measure of asset backing, then measures of gearing based on market values are relevant. Table 9 shows the smallest USM entrants to have had debt averaging 58.16% of total assets, which represents a debt:book equity ratio of 139%. However, their average debt:equity ratio at the equity price 1 month after issue was a mere 28%, and this was very significantly smaller than the overall averages of 52% for all USM entrants and 58% for all Official List entrants. This strong size differential persisted in both markets: smaller entrants were unambiguously lower geared than larger entrants when gearing was measured by market values.[2]

The differences here point to a size related phenomenon, namely that of higher market

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[1] For 24% of entrants entry is made by an 'Introduction', with no sale even of existing shares. This is most frequent where entrants change trading location from OTC markets to USM, or from USM to OL. This might be thought to confirm a restructuring link, with 'seasoned' entrants less prone to corrective issue activity than 'unseasoned' new entrants. Or it may simply be that Introductions are perceived to hold an important cost advantage over share sales. In fact financial structure is little different between the two groups of firms: average gearing of USM Introductions is 17.4%, compared with 17.5% by all methods; in the OL the figures are respectively 12.9% and 15.2%. A sale of shares during entry, therefore, is not in itself a sign of abnormally high, low, or variant financial structure.

[2] Debt:equity ratios at market values lie around 60% in both markets, but larger USM firms display relatively high ratios, reflecting the size bias in the premium of market over book values in the USM. Differences in means are significant in both markets (by the Kruskal-Wallis chi square test, $p < 0.05$ in both years for the OL, $p < 0.01$ for both years in the USM). Differences in the change in debt:equity ratios are not significant in either market, however.

**Table 9**
**Entrant financial structure, by total assets***

| | *Under £2.5m* | *£2.5–£7.5m* | *£7.5–£15m* | *Over £15m* | *Row total* | *F ratio* | *K–W chi-square* |
|---|---|---|---|---|---|---|---|
| *A. USM* | | | | | | | |
| Total debt | 58.16 | 51.36 | 48.63 | 55.81 | 54.41 | 2.92* | 6.56* |
| | 146 | 133 | 31 | 14 | 324 | | |
| | 22.53 | 20.30 | 25.86 | 18.46 | 21.83 | | |
| Next gearing | 45.13 | 49.36 | 47.37 | 58.62 | 47.66 | 2.59 | 8.67* |
| | 137 | 125 | 26 | 13 | 301 | | |
| | 18.60 | 18.96 | 22.32 | 15.44 | 19.13 | | |
| Change in gearing | −12.45 | −2.34 | −3.54 | 1.17 | −6.89 | 5.69** | 17.36** |
| | 137 | 125 | 26 | 13 | 301 | | |
| | 25.77 | 17.71 | 16.79 | 13.52 | 21.59 | | |
| Creditors, accruals | 27.50 | 26.50 | 19.50 | 21.71 | 26.07 | 2.28 | 8.64* |
| | 139 | 128 | 30 | 13 | 310 | | |
| | 15.98 | 16.90 | 18.10 | 11.50 | 16.43 | | |
| Long-term debt | 6.51 | 6.53 | 8.95 | 11.32 | 6.98 | 0.88 | 5.11 |
| | 146 | 133 | 31 | 15 | 325 | | |
| | 14.89 | 10.64 | 12.63 | 17.01 | 13.20 | | |
| Debt: equity after 12 months | 27.75 | 48.86 | 158.80 | 97.97 | 51.91 | 7.07** | 39.01** |
| | 146 | 132 | 31 | 14 | 323 | | |
| | 41.15 | 56.10 | 458.64 | 72.23 | 148.52 | | |
| *B. OL* | | | | | | | |
| Total debt | 56.56 | 55.08 | 51.66 | 52.35 | 53.89 | 0.71 | 1.80 |
| | 11 | 41 | 23 | 39 | 114 | | |
| | 14.29 | 16.69 | 19.16 | 16.89 | 17.08 | | |
| Next gearing | 49.12 | 49.69 | 44.39 | 44.79 | 46.92 | 0.73 | 2.16 |
| | 10 | 42 | 22 | 39 | 113 | | |
| | 16.75 | 14.39 | 22.42 | 18.21 | 17.70 | | |
| Change in gearing | −12.12 | −5.63 | −6.62 | −7.52 | −7.01 | 0.40 | 1.68 |
| | 9 | 41 | 22 | 38 | 110 | | |
| | 15.21 | 17.23 | 12.35 | 17.72 | 16.41 | | |
| Creditors, accruals | 29.41 | 29.93 | 22.58 | 20.13 | 25.13 | 3.38* | 7.48 |
| | 11 | 40 | 22 | 36 | 109 | | |
| | 13.51 | 16.83 | 14.48 | 11.85 | 15.01 | | |
| Long-term debt | 3.61 | 4.04 | 7.25 | 8.61 | 6.16 | 1.79 | 10.45* |
| | 11 | 41 | 22 | 37 | 111 | | |
| | 5.66 | 9.14 | 10.49 | 10.64 | 9.69 | | |
| Debt: equity after 12 months | 28.05 | 42.28 | 43.04 | 90.92 | 57.67 | 2.56 | 10.18* |
| | 10 | 41 | 23 | 38 | 112 | | |
| | 31.67 | 55.48 | 38.64 | 143.01 | 92.38 | | |

*Notes* *In this and subsequent tables OL entrants and USM/OL transfers are treated as OL and USM entrants and OTC transfers as USM.

Figures are mean (percentages of total assets, except B:S ratio), no. of firms, standard deviation.

For notes to significance tests, see Table 1.

valuations relative to total book assets for the smaller companies in the sample. Table 11 shows that 62% of companies with total assets below £2.5 million had equity market values over £2.5 million. However only 24% of companies whose total assets exceeded £15 million had market values below that figure.

This evidence of direct links between size, financing positions, and financing behaviour is equivocal. Entrants in general were not as highly geared as the contemporary sectoral averages; and on average much less financially extended than the small and medium sized firms in the *Business Monitor* samples. In both markets the smallest size

**Table 10**
**Opening gearing by total assets**

| *Total assets (x)* | *USM* | *OL* | *Total* |
|---|---|---|---|
| x < 7.5M | 55.02<br>279<br>21.71 | 56.03<br>52<br>16.19 | 55.18<br>331<br>20.92 |
| x > 7.5M | 50.87<br>45<br>23.83 | 52.09<br>62<br>17.61 | 51.57<br>107<br>20.36 |

category of entrant displayed higher debt levels, particularly of trade and other creditors, than did other firms in the samples; and these smallest firms made the biggest reductions in their debt:asset ratios, so that by 12 months after entry gearing ratios were largely indistinguishable when related to size. Quotation also affords entrants the additional signal of debt security by way of equity capitalisation, as opposed to the book values of net assets. Here the smaller firms displayed highly significantly lower debt:equity ratios than their larger fellows.

*Prima facie*, therefore, the evidence of means classifications points to entrants having distorted financial structures at the time of their entry to the market. To determine whether this is independent of the other characteristics of these samples (for example their size, risk, industry and/or yield differentials) we now consider whether these firms could be expected to display such widely differing gearing ratios. Beyond this we proceed to discuss whether entrants' subsequent debt behaviour is consistent with the hypothesis that financing 'gaps' are being closed.

## Correlation and regression results

In Marsh's analysis of issuing behaviour, target financial structures were associated with company size, risk, and asset composition (Marsh, 1982, p. 121). In Hutchinson *et al.* (1988), also, firm size and firm growth rates were found to affect financial structure, with newly quoted firms displaying both higher growth rates and higher debt ratios than did a matched sample of unquoted businesses. We proceeded to test whether debt positions and debt behaviour were significantly associated with the variables hypothesised in the literature. It is recognised that several of the measures are correlated with each other as well as potentially related to firms' debt. It is also to be expected that variables may be related in a non-linear manner. Even if the underlying characteristics were linearly related, the chosen proxies may not be. From a comparison of parametric (Pearson's product-moment correlation) and non-parametric (Spearman's rank or associative) statistics it was possible to test the possible superiority of various log-linear, exponential, or hyperbolic associations between variables at the bivariate level. This produced transforms of the basic variables which more precisely mirrored the variability in entrants' characteristics. It is these transforms that are used in the analyses reported here.

Many of these variables showed statistically significant, albeit weak, associations with the measures of entrants' gearing and with the changes made to their financial structures. The correlation matrices for the raw variables in each market are reported in Appendix 1.

The most marked results are those between the opening gearing reported in the prospectus and the change in gearing over the first year measured by (a) the difference between and (b) the logarithm of the ratio of first year to opening gearing. For USM entrants the correlation coefficients were (a) – 0.62 and (b) – 0.48. The corresponding figures for the OL sample were (a) – 0.26 and (b) – 0.44. Both are consistent with the financial restructuring motive for seeking quotation but equally both presuppose that the 'target' gearing level was the same for all entrants.

In the case of USM entrants these negative values became positive ((a) 0.40 (b) 0.43) when gearing changes are related to the one year post-quotation gearing levels. The figures for the OL reveal not only the same change in sign but also a strengthening of the association to (a) 0.54 and (b) 0.49. This would indeed suggest that the gearing adjustment was away from the opening level and more closely tied to some subsequent target. The

**Table 11**
**Relationship between total assets and market capitalisation**

| *Market capitalisation (£ million)* | | *Total assets (£ million)* <br>*<2.5* | | *2.5–7.5* | | *7.5–15* | | *> 15* | *Total* |
|---|---|---|---|---|---|---|---|---|---|
| <2.5 | | 60 | | 20 | 29% | 3 | 24% | 1 | 84 |
| 2.5–7.5 | 62% | 73 | | 67 | | 13 | | 5 | 158 |
| 7.5–15 | | 17 | 50% | 60 | | 21 | | 7 | 105 |
| >15 | | 8 | | 27 | | 18 | | 41 | 94 |

Number of observations = 441.

sign change is certainly in line with the restructuring hypothesis. It would be expected that firms with higher first year gearing levels than opening levels would have seen an increase in their gearing ratios over the first year of trading and that those with lower gearing at the end of their first year of quoted status would have exhibited a reduction in their gearing percentage.

The restructuring hypothesis is also supported by the link between the composition of any share sales and the opening and first year gearing shown in Appendix 1. Significant correlations of $-0.29$ (USM) and $-0.23$ (OL) between first year gearing and the proportion of new money raised are consistent with this as are the opening gearing/log proportion of equity issued correlations of 0.33 (USM) and 0.32 (OL). Finally it should be noted that both gearing change variables were significantly negatively correlated with these issue composition measures.

The company size effect on gearing and capital restructuring remains weak and somewhat contradictory between the samples. While the correlation between opening gearing and log (total assets) was negative for both USM and OL companies, indicating that initially larger companies have the lower gearing levels, these results were non-statistically significant in the OL sample. Interestingly the relationship, when the first year gearing is correlated with the size measure, became positive and highly significant for USM entrants while the negative and non-significant result was maintained in the OL group. Once more this supports the inference that the smaller companies found in the USM sample were using the issue process for financial restructuring purposes more than their typically larger OL counterparts. Identical conclusions may be drawn from inspection of the size/gearing change correlations.

While numerous significant correlations are found in Appendix 1 between the various gearing measures and financial features such as the P:E ratio, forecast yield and cover, the LBS risk profile variables and past and forecast profit variability information, there is very little consistency in these so that only limited substantively valid conclusions may be drawn at the bivariate level. Some evidence of a weakening link between gearing and past profitability and accounting measures of return risk and a strengthening of links with the market to used risk measures is discernible, particularly in the USM sample.

Multiple regression analysis was used to test whether the gearing levels of issue were related to prospectus information, whether gearing adjustments were related to this information and characteristics of the issue and to returns or risk data (in addition to the opening gearing) and whether the postulated targeted post-issue gearing levels could be explained by any of these factors. It was anticipated that this approach, allowing for more complex interactions between variables, would more firmly determine the source and direction of systematic links between 'target' levels of gearing in the Marsh sense and other firm characteristics.

The detailed results of these investigations are not reported here. In summary the results revealed little interpretable consistency. Explanatory levels as measured by the coefficient of determination rarely exceeded 0.3. Although in many cases the variables entering stepwise designs were highly significant they differed noticeably between the USM and OL samples. In some cases these exhibited signs opposite to expectation (for further discussion, see Buckland and Davis, 1989, ch. 6).

The regression results, when taken together with the analysis of mean gearing levels, support the proposition that while entrants were using quotation to move away from an undesired financial structure there is no observable pattern of systematic linkage with conventional sector, risk, yield or size characteristics to indicate the financial structures to which they moved.

## Summary and conclusions

Two areas of dispute within the literature are illuminated by the data analyses here. First, there is the proposition that firms entering a secondary equity market may be doing so to conclude a phase of development during which they have been inhibited in their choice of financial structure by entry barriers, credit shortages, or lack of security for lenders. In that hypothesis, one would expect to find entrants displaying inappropriate structures, altering them in systematic ways, and moving, following entry, towards some target financial structure appropriate to their circumstances. Second, there is the area of debate surrounding the characteristics of an 'appropriate' financial structure for the firm, whether large or small, growing or not, quoted or not. The choice here is between Modigliani and Miller's position that the specific structure is immaterial; the position of adherents of frictional theories of structure; and that of the emergent literature upon agency and signalling bases for gearing level choice.

Analysis has proceeded from an initial classification of means, through correlation analysis and multiple regression analysis split according to market of entry, firstly in terms of opening gearing levels and prospectus motives but also subsequent changes in firms' gearing over the first three years following quotation.

General support for the existence of a (Marsh type) restructuring process was found in the relationship between post-quotation debt management and opening gearing for both USM and OL companies, with a quite pronounced regression to a mean level of gearing for the USM entrants. This finding is further supported by examination of the linkage between new money issues and above average gearing levels. Also the debt behaviour of companies with a declared debt repayment motive is in most cases consistent with this proposition.

Our second objective was to investigate the influence of firm size (together with other risk proxies) in the debt restructuring process of new entrants to quotation. Given that the USM was created to provide greater access to secondary markets for smaller firms, and that means analysis has indicated that USM entrants reveal sharper regression to target gearing levels, our next step required the correlation of debt restructuring with relevant firm characteristics including firm size. Here the evidence is much less conclusive. While there is tentative support for the inference that the smaller USM companies were using quotation to effect changes in financial structure there is little evidence of any systematic relationship with various conventional firm characteristics including a range of risk proxies. The substantive Modigliani and Miller contentions would appear to remain largely intact.

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## Appendix 1

## Correlation Matrix for Financial Structure Variables and Entrants' Size, Yield, Profitability, Risk and Issue Performance Measures

Figures are:
- Pearson's product-moment correlation coefficient
- No. of valid pairs of observations
- Coefficients significant at better than 5% are marked *; better than 1% marked **
- USM results are reported above the diagonal, Official List below.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Opening gearing | — | 0.44**<br>302 | 0.04<br>194 | −0.62**<br>301 | 0.04<br>295 | 0.23**<br>325 | 0.56**<br>310 | 0.33**<br>303 | −0.17**<br>324 | −0.04<br>324 | 0.24**<br>323 | −0.06<br>201 | 0.33**<br>325 | 0.09<br>321 | −0.05<br>320 | −0.16**<br>247 | 0.16**<br>225 | 0.24**<br>255 | 0.05<br>30 | 0.02<br>261 |
| 1st year gearing | 0.57**<br>110 | — | 0.21**<br>191 | 0.44**<br>301 | 0.32**<br>295 | 0.06<br>302 | 0.42**<br>287 | 0.03<br>281 | 0.23**<br>301 | −0.03<br>301 | 0.06<br>300 | −0.28**<br>189 | 0.13*<br>302 | 0.09<br>301 | −0.23**<br>300 | −0.16**<br>231 | 0.03<br>210 | −0.09<br>241 | −0.36*<br>29 | 0.01<br>247 |
| 3rd year gearing | 0.47**<br>84 | 0.68**<br>86 | — | 0.43**<br>191 | 0.01<br>187 | 0.03<br>194 | 0.26**<br>185 | 0.02<br>180 | 0.13**<br>194 | 0.17**<br>194 | −0.02<br>195 | −0.14*<br>114 | −0.09<br>195 | 0.06<br>194 | 0.01<br>193 | 0.04<br>148 | 0.14<br>133 | 0.06<br>142 | −0.25<br>18 | 0.31**<br>149 |
| Change in gearing | −0.26**<br>110 | 0.54**<br>110 | 0.27**<br>84 | — | 0.25**<br>295 | −0.49**<br>302 | −0.21**<br>287 | −0.30**<br>281 | 0.33**<br>301 | −0.02<br>301 | −0.20**<br>300 | −0.19**<br>189 | −0.23*<br>302 | −0.05<br>301 | −0.17**<br>300 | 0.02<br>231 | −0.17**<br>210 | −0.30**<br>241 | −0.42**<br>29 | −0.02<br>247 |
| B:S ratio | 0.09<br>106 | 0.31**<br>109 | 0.32**<br>83 | 0.24**<br>106 | — | 0.10*<br>295 | −0.03<br>280 | 0.11*<br>274 | 0.27**<br>295 | −0.27**<br>294 | −0.09<br>293 | 0.10<br>187 | −0.15**<br>295 | −0.06<br>295 | 0.06<br>294 | −0.04<br>226 | −0.06<br>206 | −0.35**<br>237 | −0.51**<br>29 | −0.07<br>242 |
| L-T debt ratio | 0.19*<br>111 | −0.11<br>108 | −0.29**<br>82 | −0.32**<br>108 | −0.02<br>104 | — | −0.26**<br>310 | −0.03<br>303 | 0.02<br>325 | −0.02<br>325 | −0.06<br>324 | 0.15*<br>202 | −0.07<br>326 | 0.01<br>322 | 0.11*<br>321 | 0.02<br>248 | 0.01<br>226 | −0.02<br>255 | −0.36*<br>30 | 0.01<br>262 |
| Creditors ratio | 0.50**<br>109 | 0.48**<br>106 | 0.49**<br>81 | −0.03<br>106 | 0.01<br>102 | −0.32**<br>109 | — | −0.06<br>304 | −0.08*<br>310 | 0.07<br>310 | 0.13*<br>309 | −0.09<br>193 | 0.27**<br>311 | 0.15**<br>307 | −0.03<br>306 | 0.02<br>239 | 0.00<br>214 | 0.14*<br>246 | 0.15<br>28 | 0.06<br>248 |
| Overdraft ratio | 0.32**<br>108 | 0.19*<br>105 | 0.25*<br>80 | −0.14<br>105 | 0.09<br>101 | −0.00<br>108 | −0.06<br>107 | — | 0.01<br>303 | −0.07<br>303 | 0.04<br>302 | 0.21**<br>190 | 0.12*<br>304 | −0.02<br>300 | −0.01<br>299 | 0.06<br>233 | 0.10<br>208 | −0.04<br>243 | 0.22<br>28 | −0.01<br>248 |
| Total assets | −0.03<br>114 | −0.12<br>113 | −0.10<br>86 | −0.11<br>110 | 0.14<br>109 | 0.23**<br>111 | −0.25**<br>109 | −0.06<br>108 | — | 0.51**<br>325 | 0.10*<br>324 | −0.05<br>202 | −0.24**<br>326 | −0.11*<br>322 | −0.17**<br>321 | −0.25**<br>249 | −0.19**<br>226 | −0.48**<br>255 | −0.25<br>30 | −0.10<br>262 |
| Equity capitalisation | 0.05<br>112 | −0.05<br>111 | −0.08<br>84 | −0.12<br>108 | −0.31**<br>109 | 0.12<br>109 | −0.17*<br>107 | −0.03<br>106 | 0.74**<br>116 | — | 0.34**<br>324 | −0.03<br>203 | −0.01<br>326 | 0.11*<br>322 | −0.02<br>321 | 0.01<br>248 | 0.03<br>225 | 0.35**<br>255 | −0.04<br>30 | 0.11*<br>263 |
| Issue size | 0.24**<br>114 | −0.01<br>113 | −0.01<br>86 | −0.27**<br>110 | −0.05<br>109 | 0.09<br>111 | −0.07<br>109 | −0.01<br>108 | 0.71**<br>118 | 0.67**<br>116 | — | −0.32**<br>203 | 0.60**<br>325 | 0.12*<br>321 | −0.05<br>320 | 0.06<br>248 | 0.15*<br>225 | 0.24**<br>253 | −0.20<br>30 | −0.09<br>261 |
| Proportion new money | 0.10<br>53 | −0.25*<br>51 | −0.27*<br>40 | −0.34**<br>51 | 0.11<br>50 | 0.39**<br>52 | −0.30*<br>51 | 0.27*<br>52 | 0.26*<br>53 | 0.16<br>52 | 0.17<br>53 | — | −0.03<br>203 | −0.05<br>201 | 0.13*<br>201 | 0.10<br>161 | −0.09<br>149 | −0.10<br>193 | −0.28<br>22 | 0.03<br>201 |
| Proportion equity issue | 0.32**<br>113 | 0.02<br>112 | 0.04<br>85 | −0.32**<br>109 | −0.25**<br>109 | 0.06<br>110 | 0.15<br>108 | 0.20*<br>107 | 0.16*<br>117 | 0.29**<br>116 | 0.35**<br>117 | −0.01<br>52 | — | 0.07<br>323 | −0.19**<br>322 | −0.03<br>249 | 0.09<br>226 | 0.02<br>255 | 0.02<br>30 | −0.13*<br>263 |
| Beta risk | −0.03<br>113 | −0.08<br>112 | −0.06<br>85 | −0.04<br>109 | −0.03<br>108 | 0.07<br>110 | −0.21*<br>108 | 0.11<br>107 | 0.23**<br>117 | 0.25**<br>115 | 0.14<br>117 | 0.04<br>52 | 0.09<br>116 | — | 0.38**<br>322 | 0.02<br>245 | 0.08<br>223 | 0.19**<br>253 | 0.13<br>30 | 0.05<br>261 |
| Specific risk | −0.09<br>113 | −0.14<br>112 | −0.09<br>85 | −0.06<br>109 | 0.00<br>108 | −0.03<br>110 | −0.18*<br>108 | 0.10<br>107 | −0.15<br>117 | −0.12<br>115 | −0.13<br>117 | 0.20<br>52 | −0.18*<br>116 | 0.15<br>117 | — | 0.12*<br>237 | 0.04<br>249 | 0.23**<br>249 | 0.02<br>26 | 0.13*<br>209 |
| Profits variability | 0.23**<br>105 | −0.06<br>105 | −0.03<br>80 | −0.30**<br>102 | −0.03<br>103 | 0.31**<br>103 | −0.06<br>101 | 0.19*<br>101 | −0.05<br>109 | −0.04<br>109 | −0.04<br>109 | 0.16<br>50 | 0.06<br>109 | −0.00<br>108 | 0.05<br>108 | — | 0.10<br>179 | 0.31**<br>206 | −0.16<br>21 | −0.00<br>209 |
| Profits growth | 0.26**<br>87 | 0.28**<br>88 | 0.21*<br>68 | 0.00<br>85 | 0.18*<br>86 | −0.04<br>86 | 0.25*<br>85 | 0.09<br>86 | −0.12<br>91 | 0.05<br>91 | −0.06<br>91 | 0.08<br>41 | −0.08<br>91 | 0.04<br>90 | 0.06<br>90 | 0.10<br>91 | — | 0.31**<br>188 | 0.04<br>24 | 0.09<br>189 |
| Value:assets ratio | 0.26*<br>71 | 0.11<br>69 | 0.11<br>53 | −0.12<br>69 | −0.47**<br>69 | −0.16<br>70 | 0.26*<br>69 | 0.11<br>69 | −0.53**<br>71 | 0.03<br>71 | −0.24*<br>71 | −0.27*<br>52 | −0.32**<br>71 | −0.12<br>70 | 0.16<br>70 | 0.03<br>67 | 0.39**<br>56 | — | 0.17<br>35 | −0.09<br>263 |
| Subscription ratio | 0.01<br>48 | −0.10<br>49 | −0.11<br>38 | −0.12<br>48 | −0.13<br>48 | 0.01<br>47 | 0.09<br>46 | 0.23*<br>46 | −0.07<br>49 | 0.15<br>48 | 0.16*<br>49 | −0.08<br>40 | 0.01<br>48 | 0.04<br>48 | −0.22<br>48 | −0.00<br>45 | 0.11<br>36 | 0.02<br>47 | — | 0.20<br>30 |
| Discount on entry | 0.20*<br>102 | 0.02<br>102 | −0.11<br>77 | −0.18*<br>100 | −0.13<br>98 | 0.01<br>100 | 0.09<br>99 | 0.23*<br>99 | −0.07<br>105 | 0.15<br>103 | 0.16*<br>105 | 0.02<br>52 | 0.46**<br>104 | −0.11<br>104 | −0.04<br>104 | −0.06<br>96 | 0.09<br>84 | 0.43**<br>70 | 0.19**<br>48 | — |

# *THE ACCOUNTING REVIEW*

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# Disclosure in the Corporate Annual Reports of Swedish Companies

T. E. Cooke*

**Abstract**—Sweden is of interest because of the rapid growth in the Stockholm stock exchange and because of the country's disproportionate number of multinational enterprises. This paper reports on the extent of disclosure in the corporate annual reports of Swedish companies. An assessment is made as to whether there is a significant association between a number of independent variables and the extent of disclosure.

## Introduction

Whilst Sweden has a small population it is a country of some economic significance because of its disproportionate number of multinational enterprises. Indeed, the OECD has described the country as 'one of the most multinationalised in the OECD area' (Economic Survey, 1985, p. 43). Furthermore, the Stockholm Stock Exchange is the tenth largest in the world measured in terms of turnover and market capitalisation (Morgan Stanley Capital International Perspective, 1986) and yet has only about 160 listed companies (UK 2,101 as at 31 December 1987). Thus, Sweden has a number of significant economic enterprises some of which have multiple listings on the world's stock exchanges. Multiple listed companies are subject to foreign as well as domestic regulation which may have some impact on the extent of disclosure in corporate annual reports.

Despite the economic significance of the country, only limited research work has been undertaken on Swedish corporate reports. There are a number of exceptions to this generalisation. For example, in the Financial Times' *World Accounting Survey* in 1984, two Swedish companies, Volvo and ASEA, appeared in a top 10 list on accounting performance. The survey was based on the accounts of 175 companies from 20 countries—Volvo came first. In terms of accounting performance by countries, Sweden came second, South Africa first and the UK and US fifth and ninth respectively.

In another survey Cairns, Lafferty and Mantle (1984) used a scoring system to rank corporate reports in 17 countries. Sweden was ranked in the top five along with Canada, the Netherlands, the UK and the US. Annual reports in these countries were described as 'good'.

An important weakness of both of these surveys is the low number of Swedish companies included in the sample and the bias in choice of companies. For example, the Financial Times survey looked at only seven Swedish companies and the Cairns *et al.* survey analysed 10 companies—in both surveys the companies selected were quoted multinational enterprises.

A more thorough survey of financial reporting practices is undertaken by Föreningen Auktoriserade Revisorer (FAR), the Swedish Institute of Authorised Public Accountants. These surveys are produced every two or three years in English and Swedish and describe reporting practices of the top 100 listed companies.

The objectives of this paper are:

(1) to extend our knowledge of the overall extent of corporate annual report disclosure in Sweden;
(2) to assess whether there is a significant relationship between quotation status and the extent of disclosure; and
(3) to assess the extent to which disclosure is determined by quotation status, assets size, annual sales, number of shareholders, and parent company relationship.

This study is different from prior studies in two ways. Firstly, the analysis extends to 90 Swedish annual reports including both listed and unlisted corporations. Secondly, it is disclosure in the annual reports overall that is considered important and whether there are any significant differences in the extent of disclosure by listed and unlisted companies.

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*The author is senior lecturer in accountancy at the University of Exeter. He thanks Dr R. S. O. Wallace and two anonymous reviewers for their helpful comments. Financial assistance from The Institute of Chartered Accountants in England and Wales is gratefully acknowledged for a previous work on Sweden (Cooke, 1988a).

## Research methodology

*Survey of Annual Reports*

This survey covers companies which published their annual reports during the year ended 31 December 1985; most Swedish companies use the calendar year as their accounting year. The focus of this research is company reports of those enterprises subject to the disclosure and reporting requirements of the Companies Act 1975 and the Accounting Act 1976. Consequently, the regulatory framework for disclosure by all companies is identical although not all corporations may comply with statutes. The companies were selected from the 1984 edition of *Financial Information from the 4,000 Largest Companies in Sweden*, ranked by sales.

This publication is not entirely suited to the needs of this research project but was the best available. Firstly, it provides a ranking of business enterprises in general rather than limited companies specifically. Consequently cooperatives and pension funds are included. Secondly, no distinction is drawn between listed and unlisted companies, and thirdly it is not always clear as to the exact nature of the business. Another problem that required consideration is that the smaller the company the more likely it would be that their corporate annual reports would be published in Swedish only. However, it was considered important that the research should not be restricted entirely to annual reports published in English, as this might introduce a bias. A compromise had to be reached on all the above factors.

It was decided that the top 2,000 enterprises only would provide the population. A stratified random sample of 250 companies was selected for the mailing of requests for their annual reports. There was no attempt at a pure stratified random sample with probability proportional to size, but an attempt was made to achieve a sample size with subgroups of a sufficient size to permit valid statistical comparison between them. This implied choosing rather more larger companies than would otherwise have been the case. The number selected, ranked by sales, was as follows:

| *Enterprise ranking by sales* | *Number selected* | % |
|---|---|---|
| 1–30 | 15 | 6 |
| 31–250 | 110 | 44 |
| 251–1000 | 63 | 25 |
| 1001–2000 | 62 | 25 |
| | 250 | 100 |

The companies were chosen using random number tables within each respective grouping. Each company was sent a letter asking for its annual report in Swedish and, where available, a copy of a published English translation. The letters were despatched in May 1986 and the response rate was 61 per cent. A reminder letter was despatched in August 1986 and further replies were received which brought the total response rate to 81 per cent. Of the 202 sets of accounts received it was considered appropriate to eliminate banks, insurance companies, cooperatives and associations because of the specialised nature of their operations. It was not possible to eliminate such enterprises at an earlier stage since identification of their nature of business had not been possible with any reasonable degree of certainty. In addition, all subsidiaries with Swedish operating parent companies were also eliminated to avoid the possibility of double counting. This left 97 companies consisting of 90 corporations eventually used and seven which had a listing on the over-the-counter (OTC) market. The OTC companies were considered to be a group on their own and it was thought that their inclusion in either the listed or unlisted category might distort the analysis. In addition, the seven companies were considered to be too small to constitute a group on their own as this would lead to considerable statistical problems. The OTC companies were therefore eliminated leaving 90 companies in the final sample. The 90 companies were distributed in three categories as follows:

| | |
|---|---|
| (1) unlisted companies | 38 |
| (2) companies listed solely on the Swedish Stock Exchange (SSE) | 33 |
| (3) companies listed on the SSE with at least one foreign quotation (multiple) | 19 |
| | 90 |

The following versions of the company accounts were scrutinised:

| | *No.* | % |
|---|---|---|
| (1) accounts prepared in Swedish only | 23 | 26 |
| (2) accounts prepared in Swedish with an abridged English version | 13 | 14 |
| (3) accounts translated completely into English | 54 | 60 |
| | 90 | 100 |

In order to capture disclosure practices and the extent of reporting in Swedish corporate reports a scoring sheet was developed.

*Informational Items Included in the Scoring Sheet*

A major task was the selection of items of information that might be expected to be reported in corporate reports. The research was not limited to the financial statements only but rather to the entire contents of the annual report. In addition, information was not constrained to that which might be useful to one specific user group. The selection was based on items: (a) included in previous similar studies, (b) recommended for disclosure by the International Accounting Standards Committee, (c) recommended by Föreningen Auktoriserade Revisorer (FAR) or

Bokföringsnämnden,[1] (d) required by law, (e) considered to be desirable disclosures by two out of three Swedish practising accountants who were consulted at the pilot study stage. Thus, the extensive list of disclosures[2] was not directed at specific user groups, was not constrained by the exclusion of statutorily required items (Firth, 1980), or constrained by exclusion of items likely to be irrelevant to a user group (see Barrett, 1977). Such a wide-ranging approach was also adopted by Wallace (1987) in his analysis of Nigerian corporate reports.

The number of items finally selected totalled 224, distributed as follows:

| | Number of variables | % |
|---|---|---|
| (1) Financial statements: | | |
| Balance sheet items | 65 | 29 |
| Profit and loss account items | 33 | 15 |
| Other financial statements, e.g. funds flow | 21 | 10 |
| | 119 | 54 |
| (2) Measurement and valuation methods | 39 | 17 |
| (3) Ratios, statistics and segmental information | 16 | 7 |
| (4) Projections and budgetary disclosure | 9 | 4 |
| (5) Financial history | 9 | 4 |
| (6) Social responsibility accounting | 32 | 14 |
| | 224 | 100 |

### *Scoring the Disclosure Items*

There are two main approaches to developing a scoring scheme to capture levels of disclosure. The approach advocated by Copeland and Fredericks (1968) is to use a criterion based on the presentation of information. They cite the number of words used to describe an item disclosed. Such an approach leads to a scale of disclosure which varies between zero and one. However, the allocation of scores along the continuum is somewhat subjective.

The alternative approach, and that adopted in this study, is to use a dichotomous procedure in which an item scores one if it is disclosed and zero if it is not disclosed. The total disclosure (TD) score for a company is additive:

$$\mathrm{TD} = \sum_{i=1}^{m} d_i$$

where $d = 1$ if the item $d_i$ is disclosed
0 if the item $d_i$ is not disclosed
$m \leqslant n$ (discussed below)

Where there is no mention in the corporate annual report of a disclosure item, e.g. contingent liabilities, it is concluded that the item of disclosure was not relevant to that company in that year. Consequently, a company was not penalised for non-disclosure of information that was not relevant to it. In contrast, if it is apparent that an item of disclosure is relevant—for example, by mentioning say a leased asset but without disclosing amounts—then clearly $d_i = 0$. It is acknowledged that this introduces an element of subjectivity into the dichotomous procedure. However, failure to adopt such a procedure would mean that larger more diversified enterprises would be able and likely to disclose more information. To overcome this potential bias, it was considered better to read the whole of the corporate annual report and make such judgements rather than to adopt a simple disclosed/not disclosed procedure.

The additive model used here is unweighted. The implied assumption is that each item of disclosure is equally important. Clearly one class of user will attach different weights to an item of disclosure than another class of user. However, the focus of this research is not on one particular user group but rather all users of corporate annual reports. An approach which tried to encapsulate the subjective weights of a multitude of user groups would be unwieldy, and probably futile. Thus, the approach here is in effect to assume that the subjective weights of user groups will average each other out. Support for not attaching weights can be found in Spero (1979, p. 57). He found that attaching weights was irrelevant because those enterprises that are better at disclosing 'important items' are also better at disclosing 'less important items', i.e. firms are consistent in their disclosure policies.

### *Disclosure Indexes*

Once all the items have been scored an index is created to measure the relative level of disclosure by a company. The index is a ratio of the actual scores awarded to a company to the scores which that company is expected to earn. Consequently, a company is not penalised for those items that are not relevant to it. Thus, the maximum score (M) companies can earn varies:

$$\mathrm{M} = \sum_{i=1}^{n} d_i$$

where, $d$ = expected item of disclosure
$n$ = the number of items which the company is expected to disclose, i.e. $n \leqslant 224$

The total index (TI) for each company then becomes TD/M.

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[1] Bokföringsnämnden, BFN, is a public sector accounting standards body that deals with issues that were not covered by the Accounting Act.

[2] The author is willing to supply a copy of the annual report scoring sheet to interested parties.

**Table 1**
**Distribution of Disclosure Indexes**

| *Indexes* | *Unlisted* | *SSE* | *Multiple* | *Total* |
|---|---|---|---|---|
| 20–34 | 5 | — | — | 5 |
| 35–49 | 27 | 13 | 1 | 41 |
| 50–64 | 6 | 16 | 7 | 29 |
| 65+ | — | 4 | 11 | 15 |
| | 38 | 33 | 19 | 90 |

| *Chi-square* | *Significance* | *Lambda* | *Cramer's V* | *Contingency coefficient* |
|---|---|---|---|---|
| 51.44959 | 0.0000 | 0.26531 | 0.53463 | 0.60310 |

## Discussion of descriptive statistics

The range of aggregate indexes varied from 24 to 78 per cent (see Appendix 1). Over 73 per cent of listed companies had a disclosure index of 50 per cent and above whereas 84 per cent of unlisted companies had a disclosure index of less than 50 per cent. Within the listed category, 58 per cent of multiple listed companies had disclosure indexes of 65 and above compared with only 12 per cent of companies within the SSE category. The distribution of the aggregate indexes and significance tests are shown in Table 1.

The resulting chi-square, Cramer's V, the contingency coefficient and lambda from the analysis of data, all confirm that there is a high degree of association between quotation status and the disclosure indexes.

To establish which of three groups (unlisted, SSE, multiple) are significantly different from each other, a one-way analysis of variance was undertaken. The null hypothesis is that there is no significant relationship between the extent of disclosure and quotation status. In order to undertake one-way analysis of variance (and multiple linear regression—discussed later) the data must fulfil two conditions. Firstly, each of the groups must be a random sample from a normal distribution and, secondly, the variances of all groups must be equal. Standard tests (see Stuart and Ord, Chapter 3 and p. 144) of the data set on the skewness and kurtosis for the values 0 and 3 respectively indicate the acceptance of the hypothesis that the data is normally distributed. Secondly, Table 2 provides a summary of the descriptive statistics of the data. The standard deviation of each group is approximately equal suggesting that the equal-variance assumption is also approximately met. Tests for homogeneity of variances[3] confirmed that this conclusion was correct.

The F ratio is 56.8688 and when a comparison is made between the F value and the F-distribution the observed significance level is less than 0.00005. Thus, we can reject the null hypothesis that there is no significant relationship between the extent of disclosure and quotation status. Whilst we can accept that the population means are probably not equal we cannot judge which pairs of the three groups appear to have different means. To identify this SPSS$^x$ has a multiple comparison procedure to avoid the problems of multiple *t*-tests. This procedure[4] found that each group was significantly different from the other two groups at the 0.05 significance level.

This section has summarised the descriptive statistics of the data base and established that the means of the three groups are significantly different. The mean indexes (42 per cent for unlisted companies; 54 per cent for companies quoted only on the Stockholm Stock Exchange; 65 per cent for companies quoted on the Stockholm Stock Exchange plus at least one other foreign exchange) increase with quotation status. However, in addition to quotation status it is possible that a number of independent variables are associated with the

**Table 2**
**One-way Analysis of Variance**
**Disclosure Index Scores by Quotation Status**

| *Group* | *Number of companies* | *Mean* | *Standard deviation* | *Standard error* | *95% Confidence interval for mean* |
|---|---|---|---|---|---|
| Unlisted | 38 | 0.4199 | 0.0757 | 0.0123 | 0.3950 to 0.4447 |
| SSE | 33 | 0.5388 | 0.0835 | 0.0145 | 0.5092 to 0.5684 |
| Multiple | 19 | 0.6532 | 0.0815 | 0.0187 | 0.6139 to 0.6924 |
| TOTAL | 90 | 0.5127 | 0.1199 | 0.0126 | 0.4876 to 0.5378 |

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[3] Cochran's C = 0.3602, P = 1.00 (approx). Bartlett—Box F = 0.172, P = 0.842. Maximum variance/minimum variance 1.216.

[4] Scheffé procedure ranges for the 0.05 level were 3.52 and 3.52, a highly significant result.

**Table 3**
**Multicollinearity Between Independent Variables**

| | *Assets* | *Sales* | *Number of shareholders* |
|---|---|---|---|
| Assets | 1.0000 | 0.9539 | 0.9073 |
| Sales | 0.9539 | 1.0000 | 0.9028 |
| Number of shareholders | 0.9073 | 0.9028 | 1.0000 |

disclosure indexes. In order to identify which independent variables determine the extent of disclosure, a multiple regression procedure was adopted. Before the results of the regression procedure are reported it is appropriate to consider why the independent variables selected might affect the extent of disclosure.

## Company characteristics and the extent of disclosure

The multiple regression routines were tested using step-wise on SPSS.[5] This allows us to see at what stage independent variables are incorporated into the regression equation and their importance. The following variables were selected:

(1) quotation status
(2) parent company relationship
(3) annual sales
(4) total assets size
(5) number of shareholders.

One of the problems in undertaking any multiple regression analysis is that there may be multicollinearity between independent variables. Such a problem is discussed in Moore and Buzby (1972) about Singhvi and Desai's (1971) work. In order to identify the extent of the problem a correlation matrix was run off. A major (in excess of 0.9) multicollinearity problem exists between assets, sales, and the number of shareholders (see Table 3).

In order to control for multicollinearity it was decided to run three regression routines (referred to as models 1, 2 and 3). Each regression routine uses only one of the above three independent variables. This alleviates the multicollinearity problem and a comparison can then be made of the adjusted $R^2$ figures.

A second problem is that whilst three independent variables—assets, sales, and number of shareholders—are continuous, quotation status and parent company relationship are not. Since step-wise regression analysis is to be used, each categorised independent variable will require a dummy. Consequently there are three dummy variables within the independent variable, quotation status, viz. unlisted, SSE, and multiple. There are two dummy variables within the independent variable, parent company relationship, viz. the number of subsidiaries owned by the parent company, and foreign parent where the company selected is a subsidiary of an overseas holding company.

The regression equation used is as follows:

$$Y_i = \alpha_0 + \alpha_1 D_{1i} + \alpha_2 D_{2i} + \alpha_3 D_{3i} + \alpha_4 D_{4i} + \alpha_5 D_{5i} + \beta_1 X_{ji} + u_i$$

where

$Y$ = disclosure indexes
$D_1$ = unlisted
$D_2$ = listed on the Stockholm Stock Exchange
$D_3$ = multiple listed
$D_4$ = number of subsidiaries owned by the parent company (continuous data)
$D_5$ = foreign owned parent company
$D_1$–$D_5$ = dummy 0/1 variables
$X_j$ = alternative models (continuous data)
$X_1$ = assets
$X_2$ = sales
$X_3$ = number of shareholders
$u$ = the stochastic disturbance term
$i$ = the $i$th observation
$\alpha, \beta$ = constants or parameters

and where, at least one of $\alpha_1$, $\alpha_2$ and $\alpha_3$ is zero, and at least one of $\alpha_4$ and $\alpha_5$ is zero

### *Choice of Independent Variables*

(i) *Quotation Status*

The Stockholm Stock Exchange is the only authorised market in Sweden for trading both domestic bonds and shares. Whilst the number of listed companies is small, the market is significant in terms of turnover and market capitalisation. Eighty per cent of Swedish quoted companies are included on the A1 list: those with a share capital of at least SEK 10 million and at least 1,000 shareholders with round lots.

Swedenborg (1973) has characterised post-war Swedish development as 'export-induced internationalisation, involving heavily market-orientated direct investment'. As a generalisation major Swedish companies have followed what is sometimes referred to as the 'establishment chain'. The first stage is when domestic companies export to foreign countries, followed by the establishment of foreign sales subsidiaries and subsequently by the establishment of foreign manufacturing companies. Swedenborg (1973) reached his conclusion partly on the grounds that foreign investment by Swedish industry had an insignificant effect upon imports to Sweden. The implication of significant manufacturing operations abroad is that Swedish companies may wish to obtain multiple quotations of their securities in order to extend the international nature of their overall business.

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[5] The OLS estimator used for calculating the regression equations assumes that the error structure is homoscedastic.

As well as the presence of a number of multinational companies, a feature of business in Sweden is that interlocking directorships and share ownership are also common, this had led to significant power groupings. Sundqvist (1987) has identified the three major groupings to be the insurance sector, the Wallenberg investment companies, and the Volvo-Skanska grouping. Even though 10 per cent of listed companies changed owners in 1986 the three main power groupings remained unchanged. Significant power groupings may also have an impact on financial reporting.

The above features of the business environment in Sweden may have an impact on disclosure in corporate reports in general. It may be that entities subject to the requirements of a number of stock exchanges disclose a greater number of items in their corporate reports. Overseas reporting requirements may then become incorporated in annual reports. This may arise because operations in overseas markets are often financed with foreign external capital. In order to raise capital locally, disclosure practices are modified to take into consideration local reporting requirements and local customs in order to prove their creditworthiness.

Furthermore, interlocking directorships and share ownership may encourage the transfer of some of these requirements to other companies. This bandwagon effect can have desirable consequences for corporate reporting to both domestically quoted companies and to a lesser extent, unlisted companies. Unlisted companies may adopt some, but certainly not all, of the additional disclosures. However, it is for each company to weigh up the costs and benefits of increased disclosure.

Whilst the above explanation may be plausible, an alternative explanation would be that the Stockholm Stock Exchange requires companies to make additional disclosures. However, this is not the case. In order to obtain a listing on the Stockholm Stock Exchange an application for registration must be completed and then be approved by the Board of Directors of the Exchange. The application must provide details of the shares to be issued including their face value, issue price and method of subscribing for the shares. However, the Stockholm Stock Exchange does not require any additional disclosures to be made. All reasonably sized entities in Sweden are subject to the same disclosure requirements.[6]

Another explanation is that firms with the greatest external capital need will be those that disclose more information. Obtaining a listing on domestic and international securities markets is one way of reducing a company's cost of capital. Internationally traded securities permit a corporation to issue securities in the markets of lowest cost. Furthermore, increased disclosure can increase investor confidence by reducing uncertainty. 'Higher disclosure levels should allow for better estimates of the possible effects that the resolution of future uncertainties will have on future operations. Disclosure is information and more information should reduce uncertainty' (Spero, 1979, p. 15). In addition, since smaller firms are less likely to be listed they rely more on internal financing than the external financing of the securities markets (Singhvi and Desai, 1971, p. 131).

Another reason why disclosure may vary with quotation status is that agency problems may well vary with listing status. Jensen and Meckling (1976, p. 308) have defined an agency relationship 'as a contract under which one or more persons (the principals) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent'. Where there is a divorce of ownership in a firm the potential for agency costs exists because of conflicts between, firstly, shareholders and managers and, secondly, between bondholders and shareholders-managers.

A major problem is that the agent is likely to have access to superior information to the principal's. Since the principal has difficulty in observing the behaviour of the agents it is possible that the agent will use the superior information to his own advantage. It is possible that monitoring problems may vary according to quotation status. For example, an unlisted company with a small number of shareholders may be more successful in monitoring the agents than a listed company with a multitude of shareholders. Furthermore, companies with multiple quotations are more likely to have a greater number of shareholders thereby making monitoring costs more significant. Disclosure in corporate annual reports is one way of reducing monitoring costs and of alleviating the moral hazard problem (see Schipper, 1981).

### (ii) *Size of the Enterprise*

The size of an enterprise can be measured in a number of different ways. This study incorporates three size variables, viz. total assets, sales, and number of shareholders. There is no overriding reason to prefer one to another and because of the problem of multicollinearity three regression routines were run using each of the three variables alternately. There are a number of reasons why we might expect a positive association between the size of the firm and the extent of disclosure.

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[6] The Business Community's Stock Exchange Committee (NBK) periodically makes recommendations, usually in the area of investor information. Such disclosures are voluntary.

Large enterprises, which are very significant in the Swedish economy, may suffer additional political costs. For example, Stigler (1971), Peltzman (1975) and Jensen and Meckling (1976) have suggested that some voters may lobby elected officials for nationalisation, expropriation or the break-up of the entity or industry. Political lobbying may also be undertaken to increase regulation on a particular industry. In response to these 'potential government intrusions, corporations employ a number of devices, such as social responsibility campaigns in the media, to minimise reported earnings' (Watts and Zimmerman, 1979, p. 115). The size of the public sector in Sweden suggests that political costs may be significant. Elected governments have shown a willingness to bring business into public ownership when considered necessary.

Another explanation for increased disclosure by large firms is that such businesses are likely to be more complex. They are more likely to be multiproduct based and operate in a number of geographical areas including overseas. Additional complexity requires efficient management information systems to meet the needs for managerial control and meet the needs of financiers. The larger the firm the more likely it will be able to attract a wide variety of highly skilled individuals necessary to be able to introduce more sophisticated management reporting systems that can disclose an extensive array of information (Buzby, 1972, p. 76). There may also be greater demands on large firms to provide information for customers, suppliers and analysts as well as the public in general.

The number of shareholders is also a measure of size and may possibly be a surrogate for another independent variable. It can be hypothesised that the greater the number of shareholders needing information on the company the greater the diversity of information disclosure. This may result from pressure from both shareholders and analysts for additional disclosures. As Schipper (1981, p. 86) has pointed out, '... any monitoring problems that could be solved by issuing public accounting reports would [increase with] the number of owners'. Furthermore, it may be in the interests of the company to improve disclosure to increase the marketability of its securities.

Two of the major early works which investigated association between the extent of disclosure and independent variables were conducted by Cerf (1961) and Singhvi and Desai (1971). Cerf (1961) developed an index of disclosure and applied it to the annual reports of 527 US companies. The annual report scores were used to assess whether a number of corporate characteristics were associated with the extent of disclosure. Four key characteristics were identified as follows:

(1) company size measured by total assets;
(2) extent of ownership measured by the number of shares outstanding;
(3) profitability as measured by the rate of return (net profit divided by net worth);
(4) method of trading shares, i.e. New York Stock Exchange (NYSE); other exchanges; or the Over The Counter Market.

Cerf used class means (where each class was based on share trading, e.g. NYSE) and found that there was a positive association between disclosure scores and three independent variables, viz. assets size, number of shareholders, and the rate of return.

Cerf's work was refined and extended by Singhvi and Desai (1971) which provides an interesting contrast. They included the following independent variables in a step-wise multiple regression analysis: assets size, listing status, number of shareholders, earnings margin, rate of return, and CPA firm size. The coefficient of determination ($R^2$) of this multivariate model was 0.434 with 88 per cent of $R^2$ being explained by the one characteristic, listing status.

A consideration of listing status and size variables in the context of Swedish financial reporting may help to shed further light on the relationship between disclosure and some independent variables.

### (iii) *Parent Company Relationship*

This variable was segregated into firstly the number of subsidiaries owned by the parent company and secondly subsidiaries with a foreign parent company. The purpose of this segregation was to see if disclosure differs in any systematic way between such groups. Eighty three companies were put into the former category although five of these enterprises did not have any subsidiaries at all. Disclosure for each of these companies was controlled by excluding information included in the scoring sheet that was not relevant to it, e.g. consolidated accounts. Seven companies were allocated to the second category as they were subsidiaries of foreign companies.

It is not clear as to the direction of any relationship between disclosure indexes and parent company relationship. It is possible that companies with more subsidiaries will have more sophisticated reporting systems that will enable greater disclosure overall in their corporate annual reports. Consequently, the incremental cost of additional disclosure may be less than the cost, say, to unlisted companies. In contrast, it is possible

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**Table 4**
**Summary of the Step-wise Regression Routines**

| Step-number | Variable entered | $R^2$ | Adjusted $R^2$ | F-ratio |
|---|---|---|---|---|
| *Model 1* | | | | |
| 1 | unlisted | 0.44336 | 0.43704 | 70.09200 |
| 2 | assets | 0.56874 | 0.55883 | 57.36802 |
| 3 | SSE | 0.61069 | 0.59710 | 44.96698 |
| *Model 2* | | | | |
| 1 | unlisted | 0.44336 | 0.43704 | 70.09200 |
| 2 | SSE | 0.56660 | 0.55664 | 56.86882 |
| 3 | sales | 0.59376 | 0.57959 | 41.89962 |
| *Model 3* | | | | |
| 1 | unlisted | 0.44336 | 0.43704 | 70.09200 |
| 2 | SSE | 0.56660 | 0.55664 | 56.86882 |
| 3 | number of shareholders | 0.60345 | 0.58962 | 43.62410 |

that companies with more subsidiaries may be able to hide information by aggregation. Thus, the association between the number of subsidiaries and disclosure could be negative.

## Results

In terms of the adjusted $R^2$ statistic, model one, which incorporates total assets, explains 60 per cent of the variability in disclosure indexes; model two, which incorporates sales, 58 per cent; and model three, which incorporates number of shareholders, 59 per cent (see Table 4 for a summary and Appendix 2 for the final output). The degree of explanation by the independent variables selected is extremely close. This suggests that whilst size—as measured by total assets, sales, and number of shareholders—is an important variable, it does not matter which one of the three is selected.

A second important feature is that the unlisted category was selected by all three models at stage one of the step-wise regression routines. This dummy variable on its own explains nearly 44 per cent of the variability in disclosure indexes. In addition, each model also incorporates the SSE category. The multiple listed category which is left out of the equation is the yardstick against which the others are measured. Since the differential intercept coefficient for both the unlisted and SSE categories is negative it can be concluded that there is significantly lower disclosure in both of these categories when compared with the multiple listed group.

Another feature is that Model 1 introduced assets size at step two thereby increasing the adjusted coefficient of determination from nearly 44 per cent to nearly 56 per cent. Thus, assets size contributes more to the explanatory power of Model 1 than the other two size variables in Models 2 and 3. The number of subsidiaries and the fact that a company is a subsidiary of a foreign parent company is of no significance in explaining the disclosure indexes.

Previous research has also considered listing status and size variables. Studies by Singhvi (1967) and Singhvi and Desai (1971) in the US and by Firth (1979) in the UK all found that listing status was a significant explanatory variable. In contrast, Cerf (1961) and Buzby (1974) found that this explanatory factor was not significant in their studies based on US corporations.

The first measure of size, total assets, was also found to be significant in previous studies in the US by Cerf (1961), Singhvi (1967), Singhvi and Desai (1971) and Buzby (1975); in Canada by Belkaoui and Kahl (1978); in the UK by Firth (1979); and in Nigeria by Wallace (1987). The second measure of size, annual sales, was found to be a significant explanatory variable by Belkaoui and Kahl (1978) in Canada and Firth (1979) in the UK but not significant in research carried out by Stanga (1976) in the US and by Wallace (1987) in Nigeria. The third measure of size, number of shareholders, was found to be a significant explanatory variable in work in the US by Cerf (1961); in the US and India by Singhvi (1967); and in the US by Singhvi and Desai (1971). In contrast, Wallace (1987) found that this variable was not significant for Nigeria.

In relation to Sweden it has already been mentioned that multinational enterprises are of considerable importance. Companies such as Volvo, a significant European manufacturer of automobiles; Ericsson, the world's fifth largest manufacturer of telecommunications equipment (Cooke, 1988b, p. 8); and Electrolux, the world's largest white-goods manufacturer (Cooke, 1988b, p. 29), are just some of the country's companies with overseas quotations. Enterprises with multiple quotations provide a lead to other Swedish organisations in the extent of disclosure of information. This is undoubtedly partly a function of foreign regulation. For example, Electrolux has a quotation in London; its 1984 accounts highlight the raising of funds in London's capital markets to be used primarily for investment in the US. Presumably, ease in raising funds and the cost of capital, were important factors in diversifying its financing.

In contrast, companies that are listed only on the Stockholm Stock Exchange do not need such high levels of financing and need not diversify their financing operations to the same extent. Sufficient capital can be raised in the Scandinavian capital markets. Furthermore, unlisted companies rely more heavily on internal financing and adequate funds can be raised through domestic institutions. Consequently, disclosure may be made on a confidential basis rather than through the corporate annual reports.

## Conclusion

The purpose of this paper has been to extend our knowledge of the overall extent of corporate annual report disclosure in Sweden, and to assess whether there is a significant association between a number of corporate characteristics and the extent of disclosure. The paper has shown that disclosure is very variable and that there is a significant association between the extent of disclosure and listing status. A significant difference in the extent of disclosure was found between the three categories of companies—unlisted, listed only on the Stockholm Stock Exchange, and multiple listed. Disclosure by unlisted companies is lower than companies that are listed only on the Stockholm Stock Exchange. Furthermore, disclosure by companies listed only on the Stockholm Stock Exchange is lower than that for companies with multiple quotations. An explanation based on capital need and consequently foreign regulation has been put forward.

Another finding is that there is a significant association between the size of enterprises and the extent of disclosure. Three models were used incorporating one size variable in each multiple regression routine. This eliminated the problem of multicollinearity between the three size variables selected, viz. total assets, annual sales, and number of shareholders. The adjusted coefficients of determination were very similar regardless of which size variable was incorporated. As a result, whilst it may be concluded that quotation status and size are two significant explanatory factors, it does not matter which one of the three size variables is selected.

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**Appendix 1**
**Companies Covered by the Survey and Disclosure Indexes**

| *Number* | *Rank* | *Company name* | *Disclosure index*[5] *awarded* (%) |
|---|---|---|---|
| 1 | 1 | Volvo | 78 |
| 2 | 2 | Esselte | 73 |
| 3 | | Pharmacia | 73 |
| 4 | | Saab-Scania | 73 |
| 5 | | SKF | 73 |
| 6 | 6 | ASEA | 72 |
| 7 | | Euroc | 72 |
| 8 | 8 | Atlas Copco | 70 |
| 9 | | Svenska Cellulosa | 70 |
| 10 | 10 | MoDo | 68 |
| 11 | 11 | Cardo | 67 |
| 12 | | Sandvik | 67 |
| 13 | 13 | Korsnäs-Marma | 66 |
| 14 | 14 | Astra | 65 |
| 15 | | Ericsson, L.M. | 65 |
| 16 | | Skånska Cementgjuteriet | 65 |
| 17 | | Swedish Match | 65 |
| 18 | 18 | AGA | 64 |
| 19 | 19 | Perstorp | 63 |
| 20 | 20 | J. M. Byggnads och Fastighets | 62 |
| 21 | | Sydkraft | 62 |
| 22 | 22 | Grafoprint | 60 |
| 23 | | Marabou | 60 |
| 24 | 24 | Ångpanneföreningen | 59 |
| 25 | | Dagens Nyheters | 59 |
| 26 | | PLM | 59 |
| 27 | | Procordia | 59 |
| 28 | 28 | Electrolux | 58 |
| 29 | 29 | Kema Nobel | 57 |
| 30 | 30 | Bonnier | 56 |
| 31 | 31 | Ahlsell | 55 |
| 32 | | Boliden | 55 |
| 33 | 33 | Fabege | 54 |
| 34 | | Gullspångs | 54 |
| 35 | | Holmen | 54 |
| 36 | | PIA invest | 54 |
| 37 | 37 | Alfa Laval | 52 |
| 38 | | Iggesund | 52 |
| 39 | | ITT Svenska | 52 |
| 40 | | Scansped | 52 |
| 41 | | Sonessons | 52 |
| 42 | 42 | Beckers | 51 |
| 43 | | Siemens | 51 |
| 44 | 44 | Bilspedition | 50 |

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[5] The disclosure indexes have been rounded to two decimal places whereas Table 1 uses actual scores.

*—continued*

**Appendix 1**—*continued*

| *Number* | *Rank* | *Company name* | *Disclosure index*[5] *awarded* (%) |
|---|---|---|---|
| 45 | | Lundbergs | 50 |
| 46 | | Munksjö | 50 |
| 47 | | Promotion | 50 |
| 48 | 48 | Papyrus | 49 |
| 49 | | Teli | 49 |
| 50 | | Transatlantic | 49 |
| 51 | 51 | Ellos | 48 |
| 52 | | Linjeflyg | 48 |
| 53 | | Stora Kopparberg | 48 |
| 54 | 54 | Incentive | 47 |
| 55 | | Scan Coin | 47 |
| 56 | 56 | ESAB | 46 |
| 57 | | Forbo-Forshaga | 46 |
| 58 | | ICA Essve | 46 |
| 59 | | Nordstjeranan | 46 |
| 60 | | Yxhult | 46 |
| 61 | 61 | Jarnia | 45 |
| 62 | | Skoogs | 45 |
| 63 | 63 | Hallström and Nisses | 44 |
| 64 | | Fastighets AB Stockholm-Saltsjön | 43 |
| 65 | | Graningeverken | 43 |
| 66 | | Praktikertjänst | 43 |
| 67 | | Rank Xerox | 43 |
| 68 | | Regnbågen | 43 |
| 69 | 69 | ICA Hakon | 42 |
| 70 | 70 | SABA | 41 |
| 71 | | SIAB | 41 |
| 72 | 72 | Hennes and Mauritz | 40 |
| 73 | | Findus | 40 |
| 74 | 74 | Oppboga | 39 |
| 75 | | Västerås Stads Kraftvärnverke | 39 |
| 76 | 76 | Castrol | 38 |
| 77 | 77 | MKB | 38 |
| 78 | | Dickson Förvaltnings | 37 |
| 79 | | Ekonomitryck | 37 |
| 80 | | Glaslindberg | 37 |
| 81 | | Scanraff | 37 |
| 82 | | TIBA | 37 |
| 83 | | Tuaverken Försäljnings | 37 |
| 84 | 84 | Karl Hedin | 35 |
| 85 | | Mattsson | 35 |
| 86 | | Unifos | 35 |
| 87 | | Guldfynd | 34 |
| 88 | 88 | Eksjöhus | 32 |
| 89 | 89 | Abbott Scandinavia | 28 |
| 90 | 90 | Aroskraft | 24 |
| | | Average (arithmetic mean) | 51.27 |
| | | Standard deviation | 11.99 |

## Appendix 2
## Final Output of the Regression Routines

### *Model 1*

Coefficient of multiple regression 0.78146
Coefficient of determination ($R^2$) 0.61069

| | | *Analysis of variance* | | | |
|---|---|---|---|---|---|
| | | | *Degrees of freedom* | *Sum of square* | *Mean square* |
| Adjusted $R^2$ | 0.59710 | Regression | 3 | 0.78125 | 0.26042 |
| Standard error | 0.07610 | Residual | 86 | 0.49805 | 0.00579 |

*Variables in the equation*

| | *B* | *SE B* | *T* | *Sig. T.* |
|---|---|---|---|---|
| Unlisted | −0.18468 | 0.02645 | −6.981 | 0.0000 |
| Assets | 3.142597E-12 | 1.00702E-12 | 0.26077 | 0.0025 |
| SSE | −0.07632 | 0.02507 | −0.30849 | 0.0031 |
| (Constant) | 0.59992 | 0.02441 | 24.577 | 0.0000 |

*Variables not in the equation*

| | *Beta in* | *Minimum tolerance* | *T* | *Sig. T.* |
|---|---|---|---|---|
| Multiple | −1.0000 | −1.777E-16 | — | — |
| Subsidiaries | 0.09793 | 0.26395 | 1.0011 | 0.3151 |
| Foreign | 0.02152 | 0.36152 | 0.299 | 0.7656 |

### *Model 2*

Coefficient of multiple regression 0.77056
Coefficient of determination ($R^2$) 0.59376

| | | *Analysis of variance* | | | |
|---|---|---|---|---|---|
| | | | *Degrees of freedom* | *Sum of square* | *Mean square* |
| Adjusted $R^2$ | 0.57959 | Regression | 3 | 0.75960 | 0.25320 |
| Standard error | 0.07774 | Residual | 86 | 0.51970 | 0.00604 |

*Variables in the equation*

| | *B* | *SE B* | *T* | *Sig. T.* |
|---|---|---|---|---|
| Unlisted | −0.19981 | 0.02592 | −7.708 | 0.0000 |
| SSE | −0.08568 | 0.02538 | −3.376 | 0.0011 |
| Sales | 2.009946E-12 | 8.38161E-13 | 2.398 | 0.0186 |
| (Constant) | 0.61561 | 0.02373 | | |

*Variables not in the equation*

| | *Beta in* | *Minimum tolerance* | *T* | *Sig. T.* |
|---|---|---|---|---|
| Multiple | −1.00000 | −0.601E-16 | — | — |
| Subsidiaries | 0.12111 | 0.27124 | 1.237 | 0.2194 |
| Foreign | 0.02031 | 0.39118 | 0.276 | 0.7830 |

### *Model 3*

Coefficient of multiple regression 0.77682
Coefficient of determination ($R^2$) 0.60345

| | | *Analysis of variance* | | | |
|---|---|---|---|---|---|
| | | | *Degrees of freedom* | *Sum of square* | *Mean square* |
| Adjusted $R^2$ | 0.58962 | Regression | 3 | 0.77200 | 0.25733 |
| Standard error | 0.07680 | Residual | 86 | 0.50730 | 0.00590 |

*Variables in the equation*

| | *B* | *SE B* | *T* | *Sig. T.* |
|---|---|---|---|---|
| Unlisted | −0.18488 | 0.02755 | −6.711 | 0.0000 |
| SSE | −0.07785 | 0.02561 | −3.040 | 0.0031 |
| Number of shareholders | 1.322664E-12 | 4.67843E-07 | 2.827 | 0.0058 |
| (Constant) | 0.60442 | 0.02465 | 24.521 | 0.0000 |

*Variables not in the equation*

| | *Beta in* | *Minimum tolerance* | *T* | *Sig. T.* |
|---|---|---|---|---|
| Multiple | −1.00000 | −1.601E-16 | — | — |
| Subsidiaries | 0.14342 | 0.23625 | 1.522 | 0.1318 |
| Foreign | 0.01645 | 0.33871 | 0.227 | 0.8213 |

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# The Valuation Approach to Stock Market Impact: Some Tests With SSAP 16 (Current Cost Accounting) Disclosures

**A. C. Darnell and L. C. L. Skerratt***

**Abstract**—The purpose of this paper is to evaluate the role of security price models in measuring the impact of accounting information on financial markets. This contrasts with the more common approach of employing security returns. The tests here examine some econometric properties of the price model approach in the context of current cost disclosures required by SSAP 16. Special consideration is given to an important statistical issue likely to be met in the valuation approach, namely the heteroskedasticity of the error term. The evidence suggests that a simple security price model can provide an effective tool in accounting event studies.

## I Introduction

The purpose of this paper is to evaluate the role of security valuation (or price) models in measuring the impact of accounting information on financial markets. This contrasts with the more common route which approaches the problem through an analysis of the impact of security returns (or value changes). In their review of market based research, Lev and Ohlson (1982, pp. 304–310) are critical of the exclusive concentration on returns; they argue that, since the information content of any set of accounting variables must have an effect on both valuation levels and value changes, the standard empirical procedure of using security returns alone requires explanation and justification. They identify the comparative econometric properties of the two experimental designs (returns and values) as a key issue.

This paper attempts to further the debate by exploring the power of the valuation method, in the context of the SSAP16 (Current Cost Accounting) disclosures. In addition, special consideration is given to statistical issues raised by the valuation approach. A significant drawback of price models is that the estimated residuals are likely to reflect a heteroskedastic model. In view of the absence of a successful and justifiable theoretical adjustment to the estimating equation, we use the White (1980) adjustment to the OLS standard errors. A considerable advantage of the procedure for this and future research is that a formal identification of the structure of the heteroskedasticity is not required.

The paper is organised as follows. The next section gives an introduction to the returns versus valuation issue. Section III examines the market impact of historical and current cost disclosures employing a valuation approach. Within this, there are sub-sections on (i) the data set and definition of variables, (ii) the results of a simple linear regression model, and (iii) the results from specifying an investment opportunities approach to valuation. Section IV compares the White approach with some conventional scaling methods for the elimination of heteroskedastic disturbances in the price equation. Section V presents the main conclusions: essentially, we find that a simple security price model can provide an effective tool in accounting event studies. Section VI discusses the limitations of the study and further avenues for research.

## II Returns versus valuation models

Probably the strongest advocacy for the returns approach is to be found in Gonedes and Dopuch (1974). They argue that, since dividend or earnings capitalisation models do not incorporate a theory of valuation under uncertainty, conclusions based on them are unreliable. In contrast, the familiar two parameter asset returns model (CAPM) deals explicitly with uncertainty. However, such arguments should not be directed at valuation models

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*per se* since the CAPM itself, although normally expressed as a returns model, can also be formulated as a valuation model (see Fama and Miller, 1972, p. 296). Recent examples of CAPM valuation approaches to accounting issues are Bowen (1981) and Daley (1984). However, there is evidence to suggest that other valuation methods may be required. For example, Boatsman and Baskin (1981) compare the prediction errors from the two parameter CAPM with those from a price-earnings model; although the relative performance of the CAPM suggests that it is marginally superior, its predictive ability is not particularly impressive. Other authors, Gibbons (1982) and Levy (1983) for example, go further and suggest that the CAPM model may be grossly misspecified.

In view of such doubt about CAPM as the appropriate model of security prices, other models should be considered in the conduct of market impact studies. One alternative is provided by Garman and Ohlson (1980) who substantially strengthen the theoretical underpinnings of the familiar price-earnings models. They provide a formal characterisation of the linear mappings from accounting information to equilibrium prices; and more recently, Ohlson (1983) demonstrates that with some restrictions current earnings are valuation sufficient, i.e. 'no other information but earnings is conceivably relevant in the valuation process' (p. 153). These conclusions lend support to the prominent role of price-earnings calculations in financial markets.

Ohlson is not directly concerned with the empirical success such a reduced form mapping might have in predicting share prices. This latter issue is taken up by Easton (1985). Using data for 1962–1980, Easton shows a strong link between share prices and the present value of future dividends; on average the $R^2$ is 0.60.[1] Then, employing a single independent variable in a linear regression, historical cost earnings per share are shown to be significantly correlated with the present value of future dividends; on average the $R^2$ is 0.57.

Apart from the above evidence which would support the use of price-earnings models in market impact studies, there are other factors which may actually favour a valuation approach. In a returns framework, the market impact of information disclosure is assessed by monitoring proportionate changes in share price during a specified time interval. A major strength of this returns approach is that the position and length of the time interval can be varied so as to sharpen the measurement of any wealth effect.

However, this potential gain can also turn out to be a serious disadvantage. The selection of the appropriate time interval in a returns study is likely to be critical to the power of the statistical tests to detect any market reaction; moreover, the choice is by no means straightforward. One significant requirement of the design is the proportion of the disclosure which constitutes 'news'. If market expectations immediately before announcement can be measured only with substantial error, it may be necessary to lengthen the time interval up to announcement day; however, this may introduce confounding price movements into the test. Furthermore, if the speed with which information is anticipated by the market varies across securities, then the optimal time interval for each sample observation may also be different.[2] Another dimension to the difficulties is that some market agents may be more efficient than others at collecting and analysing publicly available information; this calls into question the very meaning of 'market' expectations.

In contrast, a valuation experimental design examines the relationship between a company's share price on announcement day and the level of its disclosed earnings. This means that it is not necessary to distinguish between anticipated and unanticipated disclosure; the price on the release date will reflect both the incremental news of the announcement and the prior impact of any leakage. Lev and Ohlson (1982) suggest that this property could make the valuation approach an attractive one in market impact research.[3] Another rationale for the valuation approach could be the presence of measurement error in the accounting variables; this is explored in Landsman and Maglioli (1988).

However, working with share prices rather than price changes brings its own difficulties; it is possible that the measurement problems are simply exchanged. Although there is no need to identify the 'news' element of disclosure, the valuation approach must adjust share prices for confounding variables which may mask the effect of the disclosed item. For example, in an investigation of disclosed historical cost earnings, the effect of a company's growth prospects would need to be eliminated. In this respect, the requirements of the returns approach are relatively modest; the only adjustment needed is each company's response to market movements, and Brown and Warner (1980) have suggested that even this is not critical in identifying information impact.

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[1] This issue is also addressed in Shiller (1981) which takes a critical look at the variances over a long time horizon. The results suggest that the market moves too much to be justified by movement in the present value of dividends. Given the short run framework of the current investigation there is no necessary inconsistency between the two studies.

[2] Evidence which suggests that security prices of large firms begin to anticipate reported earnings much earlier than small firms' security prices is given in Freeman (1987); also, the speed of adjustment may be related to the size of the signal (Woodruff and Senchack, 1988). Dopuch, Holthausen and Leftwich (1986) give an indication of the possible methods for tackling some of these measurement issues.

[3] A cumulative approach is possible within the returns framework (for example, the Abnormal Performance Index of Ball and Brown, 1968). However, there are drawbacks: first, the API requires that market expectations be identified at the beginning of the cumulation period; secondly, observations are grouped into portfolios according to the surprise of the disclosure, thus eliminating some of the sample variation.

Another disadvantage of price models is that they are less likely than returns models to satisfy the homoskedasticity assumption of ordinary least squares (OLS) regression estimation.[4] This assumption specifies that the variances of the error terms in the model should be constant. Of course, other estimation techniques are available when this assumption is violated, but the required adjustments are often judgmental, leading to a perceived fragility in the research conclusions.

The primary purpose of this paper is to investigate these two important problem areas in the valuation approach. Unless they can be resolved with some degree of parsimony, it is unlikely that price models will be able to offer an alternative experimental design for market impact studies. The disclosure context of this investigation is current cost earnings of SSAP 16.

## III A valuation approach to the impact of current cost disclosures

This section examines the potential of the valuation experimental design by investigating the ability of some simple price models to detect the presence of historical and current cost earnings announcements. The data set employed is that of Peasnell, Skerratt and Ward (1987) (hereinafter PSW) who employ a returns framework and find a small incremental impact of current cost, in addition to an historical cost effect, in the days up to announcement.

The price models tested here are extremely simple; the variables are restricted to share prices, together with the reported historical and current cost earnings.[5] This was done for two reasons. Firstly, on grounds of parsimony, it is useful to identify the properties of simple models, in the spirit of other investigations such as Brown and Warner (1985). Secondly, in order to make direct comparisons with the PSW study it is important to constrain the variables to those included in that study.

The price models employed here can also be related to the study by Easton (1985) which examines the link between share prices, dividend realisations and historical cost earnings. Easton notes (p. 76) that 'there is information about future dividend realisations that is not captured by [historical cost] accounting earnings'. Consequently, the tests here can also be viewed as addressing the issue of what measurements should constitute 'accounting earnings' in that context.

A recurring theme of many current cost studies is the identification of an appropriate deflator for earnings. For example, Beaver and Landsman (1983) use sales, whilst Lustgarten (1982) varies the deflator and employs total assets and market value, amongst others. Christie (1986) has added to this debate by arguing that, when the dependent variable is the share return, then the only deflator which is justifiable on *a priori* grounds is the market value of the equity. This approach has been taken in some subsequent returns studies (e.g. Bublitz, Frecka and McKeown, 1985). However, it is still not clear how the deflator should be chosen within a valuation approach.

The basic empirical rationale for deflation is to adjust for the potential effect of heteroskedasticity. In the familiar general linear model, ordinary least squares estimation is known to generate best, linear unbiased estimators of the model's coefficients, when the true error structure is a white noise process (i.e. the errors have a zero mean, a scalar variance-covariance matrix and are independent of the regressors). In the presence of heteroskedasticity the errors retain their zero mean and independence of the regressors, but now have a non-scalar variance-covariance matrix; applying OLS will yield linear, unbiased estimators which are inefficient; more importantly, the usual OLS formula for estimating the variance of each estimated coefficient will be inapplicable, and, hence, invalidate the standard 't' and 'F' statistics.

In this study, heteroskedasticity is dealt with by employing the White (1980) proposal.[6] In summary, the procedure uses the OLS estimators of the coefficients but it employs the constructed OLS residuals to estimate the variance of each error term; the standard error of each OLS coefficient is then adjusted accordingly. It should be noted that the White procedure does not provide a solution to heteroskedasticity in the usual sense; that is, it is not a procedure which generates a transformed equation whose disturbances are white noise. Specifically, it should be noted that the procedure generates only consistent (i.e. giving correct results asymptotically) estimators of the standard errors; furthermore the OLS $\hat{b}$ estimators are inefficient.

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[4] Employing a returns model, however, is no guarantee of homoskedasticity; see for example, Malatesta and Thompson (1985).

[5] In contrast, the study by Beaver and Landsman (1983) maps three variables (accounting earnings, a risk measure and growth) into security prices.

[6] Results similar to those of White are demonstrated in Eicker (1967). Other methods for dealing with this problem in a CAPM framework are given in Sefcik and Thompson (1986) and Bernard (1987). Their discussion assumes that a long time series of data is available. In cases where this condition is not fulfilled, Bernard suggests that the White method may be a fruitful approach.

However, when the model cannot be acceptably respecified to one which has white noise disturbances, this procedure does enable statistical inference to proceed.[7] Details are given in the Appendix.

### (i) *The Data Set and Definition of Variables*

The accounting data and stock prices used for this study are those used by PSW in their study of current cost accounting within a returns framework. The source of all the data is Datastream, with the exception of the date of announcement of the annual earnings which is taken from Extel News cards.

The sample of 208 companies accounted for just over half the total UK Stock Exchange equity market capitalisation as at 30 September 1983. SSAP 16 information was disclosed in at least two of the accounting year ends 1980 through 1983. Over the four reporting periods examined, a maximum of 496 cases were available; however, missing data precluded the use of all of these cases in every equation.

The definition of variables is as follows:

$P_{jt}$ = the closing price of share $j$ on the announcement day of the annual earnings of year $t$,
$P_{jt-1}$ = the closing price of share $j$ on the announcement day of the annual earnings of year $t-1$,
$HCA_{jt}$ = the annual HCA earnings per share for year $t$, before extraordinary items (Datastream 183) disclosed on announcement day,
$CCA_{jt}$ = the annual CCA earnings per share for year $t$, before extraordinary items (Datastream 251) disclosed on announcement day (the same day as for HCA earnings),
$ADJ_{jt} = HCA_{jt} - CCA_{jt}$
= the adjustments made to HCA to derive CCA.

### (ii) *A Simple Valuation Model*

One specification of the linear mapping from accounting earnings to share price on announcement day is to assume a simple linear statistical model as in Easton (1985), given in equation 1 below.

$$P_{jt} = a + b \cdot HCA_{jt} + c \cdot ADJ_{jt} + e_{jt} \qquad (1)$$

where $a$, $b$, and $c$ are constants and $e_{jt}$ is the error term. This equation specifies the current cost variable (ADJ) as the difference between HCA and CCA. The model, with constants $a$, $b$, and $c$, assumes that the sensitivity of share price to each earnings variable is identical for each firm. As shown by Garman and Ohlson (1980), this is unlikely to be the case; consequently, this assumption is relaxed later.

Estimates of equation 1 are given in Table 1. The coefficient on HCA is positive and that for ADJ is negative; this accords with predictions from the inflation accounting literature (see for example, Whittington, 1983). Although the coefficients $a$ and $b$ appear significant when the standard errors are computed by the usual OLS formula, this inference may not be justifiable because the standard errors are biased due to the heteroskedasticity in the error term. This can be seen from the rank correlations of the absolute values of the residuals with the

**Table 1**
**OLS regression of announcement day share price on historical cost earnings per share and the current cost adjustments for the reporting years 1980–83**

$$P_{jt} = a + b \cdot HCA_{jt} + c \cdot ADJ_{jt} + e_{jt}$$

| | *a* | *b* | *c* | *No. of Cases* | $R^2$ |
|---|---|---|---|---|---|
| OLS estimates | 61.17* | 9.63* | −3.46* | 496 | 0.59 |
| OLS computed 'standard errors' | 6.28 | 0.41 | 0.67 | | |
| Rank correlation of variable with absolute residual (the appropriate 5% critical value is 0.08) | | 0.36 | 0.03 | | |
| White standard errors | 7.85 | 0.76 | 1.15 | | |

Note: *statistically significant at 5% with White standard errors.

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[7] See White (1980, pp. 827–828) for a brief discussion of model respecification *vs.* heteroskedasticity correction. In this study, it might be argued that the omission of variables such as expected growth could be a source of heteroskedasticity. However, heteroskedasticity would still be likely because the dependent variable is unscaled. Also, the estimators are unbiased as long as the effect of the omissions, in aggregate, is distributed with zero mean and is stochastically independent of the regressors.

independent variables.[8] The presence of heteroskedasticity gives rise to two problems. First, the OLS estimator of the coefficient is no longer best (i.e. the estimator does not have minimum variance); second, and more importantly, the OLS estimator of the sampling variance is biased. The optimal route would be to respecify the equation in order to generate best linear unbiased estimates. However, as will be seen in later sections of this paper, a number of respecifications were examined all of which resulted in failure to generate white noise errors. We therefore proceed to make inferences from equation 1 using the White procedure. Although the 'White' standard errors in Table 1 are larger than the 'OLS' standard errors, we may infer that the coefficients are indeed significant at 5%.

### (iii) *An Investment Opportunities Approach to Valuation*

Garman and Ohlson (1980) show that, when the state variable is confined to dividends, the linear information valuation model can be expressed in terms of the familiar dividend capitalisation model. This allows us to be more specific about the reduced form mapping from earnings to security prices. An investment opportunities approach similar to that of Miller Modigliani (1961, equation 12) may be used in this context. Their investment opportunities equation partitions the value of the firm in two. The first component is the discounted stream of net cash flows from the existing capital stock; they assume for simplicity that identical net cash flows will be generated in perpetuity. The second part measures the additional cash flows from further corporate investment after deducting the cost of funding the extra capital. They show that this valuation method is identical to (*inter alia*) the dividend capitalisation model. One form of the investment opportunities approach is given in equation 2.

$$V_{jt} = X_{jt}/i + I^*_{jt}/i \qquad (2)$$

where

$V_{jt}$ = the value of corporation $j$ at time $t$,
$X_{jt}$ = the sustainable earnings of corporation $j$ from existing assets,
$I^*_{jt}/i$ = the value of excess profits on corporation $j$'s future investments,
$i$ = the discount rate.

Equation 2 may be rearranged to give

$$V_{jt} \cdot i = I^*_{jt} + X_{jt}. \qquad (2a)$$

Dividing both sides by the number of outstanding equity shares, the impact of earnings per share in this model may be estimated by equation 3.

$$P_{jt}(\ln P_{jt} - \ln P_{jt-1}) = a + b \cdot HCA_{jt} + c \cdot ADJ_{jt} + e_{jt} \qquad (3)$$

where $a$, $b$ and $c$ are constants and $e_{jt}$ is the error term. The term $(\ln P_{jt} - \ln P_{jt-1})$, the continuously compounded rate of return between the two announcement dates, serves as a proxy for the discount rate, $i$.[9] The excess profits component of equation 2a is estimated by the constant term '$a$' in equation 3. This specification may appear to be unrealistic, since $I^*_{jt}$ is bound to vary across the sample. However the OLS formula for the estimation of the constant is identical to that when the intercept is specified to vary randomly across the sample.[10] Given the wide industrial coverage of the sample, this random intercept interpretation of the OLS formulae may be justifiable, at least for the purposes of estimating the coefficients on HCA and ADJ. Effectively we assume that any error resulting from this way of looking at the constant is uncorrelated with the independent variables.

The estimate of sustainable earnings from existing capital $X_{jt}$ is constructed from two components, HCA and ADJ, as is suggested by the replacement cost view of income measurement (Whittington, pp. 116–121 and 158–160). The role of the coefficients $b$ and $c$ require clarification since the coefficient on $X_{jt}$ in equation 2a is defined as unity. It should be noted that the Miller Modigliani algebra, for simplicity, does not incorporate expectations about inflation. Relaxing this assumption can proceed as follows. Sustainable earnings in the most recent financial year $X_{jt}$ are measured in terms of existing purchasing power units; consequently, in the discounting formula an adjustment for expected inflation is necessary. Defining the discount rate, $i$, as nominal and assuming that the inflation rate for corporate cash flows, $r$, is expected to be the same for all future

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[8] White (1980) provides not only a heteroskedastic consistent estimator of the variance-covariance matrix of the OLS estimators, but also a test for heteroskedasticity. We have not used that test here, but rather the non-parametric rank correlation test (see, for example, Johnston, 1972, p. 219). Our use of the rank correlation test is more restrictive than the White proposal; but since the presence of heteroskedasticity is indicated, the White test would have produced an identical conclusion.

[9] The proxy for the discount rate should be positive. Observations were excluded if this condition was not satisfied.

[10] This can easily be seen. Consider the simple model:

$$Y_j = (K + e_j) + bX_j + u_j$$

in which $E(e_j) = 0$, $K_j = (K + e_j)$ is the constant term for each company $j$ and $u_j$ is an error term with the usual properties. When OLS is applied, the constant term in the estimated equation will be an estimator of $K$, as long as $e_j$ and $X_j$ are uncorrelated; the term $e_j$ is treated along with $u_j$ as the error. Indeed, the more usual model with a fixed intercept is observationally equivalent to one which has a random intercept as described here. Consequently, this interpretation is always available.

**Table 2**
**OLS regression of announcement day share price times discount factor on historical cost earnings per share and the current cost adjustments for the reporting years 1980–83**

$$P_{jt}(\ln P_{jt} - \ln P_{jt-1}) = a + b\cdot \mathrm{HCA}_{jt} + c\cdot \mathrm{ADJ}_{jt} + e_{jt}$$

| | *a* | *b* | *c* | *No. of Cases* | $R^2$ |
|---|---|---|---|---|---|
| OLS estimates | 31.50* | 2.97* | −2.71* | 296 | 0.15 |
| OLS computed 'standard errors' | 6.06 | 0.42 | 0.67 | | |
| Rank correlation of variable with absolute residual (the appropriate 5% critical value is 0.11) | | 0.22 | −0.06 | | |
| White standard errors | 6.05 | 0.70 | 1.12 | | |

Note: *statistically significant at 5% with White standard errors.
200 cases from the initial 496 were excluded because either $\ln P_{jt-1}$ was not available or was larger than $\ln P_{jt}$.

periods, then the sustainable earnings component of company value is:

$$\sum_{k=1}^{\infty} \mathrm{X}_{jt}\cdot\{(1+r)/(1+i)\}^k$$
$$=\{(1+r)/(i-r)\}\{i/i\}\cdot \mathrm{X}_{jt} \quad (4)$$

Then $\hat{b}$ and $\hat{c}$ of equation 3 are unweighted estimates of the term $\{(1+r)/(i-r)\}i$ on the RHS of equation 4; $\hat{b}$ relates to the HCA component of $\mathrm{X}_{jt}$, whilst $\hat{c}$ relates to the ADJ component.

Estimates of the investment opportunities model are given in Table 2. The results are similar to those in Table 1; the coefficient on HCA is positive and that for ADJ is negative. There is clear evidence of heteroskedasticity in the error term, indicating the need for the use of a correction to the OLS standard errors. After this adjustment both HCA and ADJ are significantly different from zero. The coefficients $b$ and $c$ can also be related to equation 4. First, apart from their sign, the coefficients are not significantly different from one another. This suggests that HCA and ADJ are of equal weight in constructing estimates of sustainable earnings, as predicted by replacement cost theory. Secondly, the coefficients take plausible values. For example, if $i = 10\%$ and $r = 5\%$, then $\{(1+r)/(i-r)\}i = 2.1$; the estimates of $b$ and $c$ are similar to this value. However, this finding may not be robust to changes in the specifications of other parts of the model, namely the estimation of the discount rate and the excess profits from future investment.

## IV Comparison with scaling methods

In order to assess the merits of the White procedure, it is important to compare the results with those given by the more customary practice of scaling by financial variables such as sales or assets. If the conventional scaling factors can produce well behaved residuals the White procedure is not necessary. The rationale for scaling is as follows.

If $e_i$ is the true error of a regression model and $\mathrm{V}(e_i) = k_i^2\sigma^2$ then $\mathrm{V}(e_i/k_i) = \sigma^2$ (i.e. $e_i$ scaled by $k_i$ is homoskedastic). Therefore dividing the *whole* regression equation by $k_i$ gives a homoskedastic error. OLS will then yield the best linear unbiased estimator. This is generalised least squares (GLS) in the form of weighted least squares (WLS).

Three comments are in order. First, if the original equation has a constant term, then the scaled equation must have a term of the form $1/k_i$; that is, excluding the constant term from the deflation process has no theoretical justification. Secondly, unless the original equation contains the variable $k_i$, the scaled equation will not have a constant. Thirdly, in this context, there is little or no theory concerning the choice of scaling variable (see for example Beaver and Landsman, 1983, pp. 77–78); the procedure is *ad hoc*. This is the source of our objection to this procedure even though the estimators *may* be more efficient than OLS (see White, 1980, p. 827).

In order to examine some of these issues, the simple model in equation 1 is estimated with three different deflators ($=\mathrm{D}_{jt}$), sales, equity assets and market value in the form shown below.

$$\mathrm{P}_{jt}/\mathrm{D}_{jt} = a/\mathrm{D}_{jt} + b\cdot \mathrm{HCA}_{jt}/\mathrm{D}_{jt}$$
$$+ c\cdot \mathrm{ADJ}_{jt}/\mathrm{D}_{jt} + e_{jt}/\mathrm{D}_{jt} \quad (5)$$

The results are given in Table 3. They show that when the conventional $t$ test is applied HCA appears to be significant for all three deflators. ADJ appears to be significant when equity assets are employed but not when sales and market value

**Table 3**

**OLS regression of announcement day share price on historical cost earnings per share and the current cost adjustments, scaled by $D_{jt}$ for the reporting years 1980–83**

$$P_{jt}/D_{jt} = a/D_{jt} + b\cdot \text{HCA}_{jt}/D_{jt} + c\cdot \text{ADJ}_{jt}/D_{jt} + e_{jt}/D_{jt}$$

| OLS estimates<br>(OLS computed 'standard error') | *a* | *b* | *c* | *No. of Cases* | $R^2$ |
|---|---|---|---|---|---|
| $D$ = Sales | −17.90 | 18.84 | −0.11 | 458 | 0.93 |
| | (5.90) | (0.39) | (1.02) | | |
| $D$ = Equity assets | −5.32 | 16.12 | −3.87 | 458 | 0.88 |
| | (5.83) | (0.42) | (1.22) | | |
| $D$ = Market value | 12.89 | 10.20 | 0.94 | 488 | 0.78 |
| | (4.14) | (0.40) | (0.71) | | |
| $D = \text{HCA}^{0.5}$ | 32.40 | 11.77 | −4.13 | 496 | 0.18 |
| | (4.22) | (0.43) | (0.67) | | |
| $D = \text{HCA}^{1.0}$ | 17.69 | 13.44 | −3.76 | 496 | 0.15 |
| | (2.67) | (0.44) | (0.69) | | |

| Rank correlation of variable with absolute residual | *a* | *b* | *c* | The appropriate 5% critical value |
|---|---|---|---|---|
| $D$ = Sales | 0.69 | 0.83 | 0.19 | 0.09 |
| $D$ = Equity assets | 0.72 | 0.81 | 0.07 | 0.09 |
| $D$ = Market value | 0.62 | 0.67 | 0.08 | 0.08 |
| $D = \text{HCA}^{0.5}$ | −0.15 | 0.15 | −0.15 | 0.08 |
| $D = \text{HCA}^{1.0}$ | 0.11 | 0.00 | −0.22 | 0.08 |

Note: 38 cases from the initial 496 were excluded because sales and equity assets were not available.

8 cases from the initial 496 were excluded because market value was not available.

are used. However, the most important point to note is that for all three regressions there is evidence of *substantial heteroskedasticity* in the error term. This means that studies employing deflators should not assume that scaling automatically leads to well behaved residuals.[11]

Of course, the particular implementation of GLS discussed above is not the only one available. An often used technique is to scale by that independent variable which seems to be the cause of the heteroskedasticity. In Table 1, there is significant rank correlation between HCA and the OLS residuals. Different values of $\text{HCA}^s$ ($s = 0.1,\ 0.2 \ldots 3.0$) were tried as scaling variables but with no success. A sample of the results is given in Table 3, for $s = 0.5$ and $s = 1.0$. In addition, the experiment was applied to the investment opportunities model above, but with no improvement in the behaviour of the residuals.[12] This material is not reproduced here for space reasons, but is available on request.

## V Conclusions

The primary purpose of the paper is to investigate two empirical issues which arise when valuation models are used in market impact studies. The two issues are:

1. the extent to which a simple model can be used as a parsimonious approximation to the pricing of securities on the London Stock Market, and
2. the identification of an effective solution to heteroskedasticity, which is likely to arise in share pricing models.

The data used here are those of Peasnell, Skerratt and Ward (1987) who, in a returns framework, find a small impact of current cost earnings in the days up to announcement. The major conclusions of our study are as follows:

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[11] A variation on this method of scaling is to exclude the constant from the deflation procedure (see for example Beaver and Landsman, 1983, Table 24), even though this has no justification in terms of WLS. In order to test the sensitivity of our results, Table 3 was reworked for this variation; the results were substantially unchanged and are available on request. Furthermore, Lustgarten (1982 pp. 126–128) gives similar results to Table 3, despite a different model specification from equation 5. In that study a replacement cost effect is identified with an assets deflator, but not when market value is employed; the residuals also exhibit heteroskedasticity as measured by the Spearman rank correlation test.

[12] Another estimation method which results in scaling is that of random coefficients. This specifies the coefficients as varying across the sample (see, for example, Maddala, 1977, ch. 17). This technique also failed to eliminate completely the heteroskedasticity.

1. Simple pricing models are sufficient to identify the effect of both historical cost and current cost disclosed earnings, in line with the results of PSW. Two models are investigated here, one in which price is simply a linear function of disclosed earnings, and another which is based on the investment opportunities valuation model of Miller and Modigliani (1961).
2. One response to heteroskedasticity is to scale the equation in some way. A major drawback of this approach is that, in many cases, the choice of scaling variables is *ad hoc*. Notwithstanding this difficulty, a number of conventional scaling procedures were applied to the price model; however, they were unsuccessful in generating homoskedastic residuals. In view of these results, we employed the procedure suggested by White (1980). This allows statistical inference from the OLS parameter estimates by directly taking into account the form of the heteroskedasticity inferred from the residuals. Additional advantages of this method are that judgment by the researcher is not required and the computation is relatively straightforward.

## VI Limitations and further research

Although the valuation approach is able to identify a current cost effect in the sample data, caution is necessary about the power of the experimental design to transfer to other disclosure contexts.

1. Although the White procedure provides heteroskedastic consistent estimates of the sampling variance so that statistical inferences may be made, it should be noted that the OLS estimators are still inefficient. This means that, if the source of the heteroskedasticity could be identified, then a more efficient estimator could be calculated.

We investigated some of the obvious solutions to finding a more efficient estimator, but no search can be completely exhaustive. Furthermore, although some approaches may appear to be attractive, their rationale in this context is not clear. For example, Atkinson (1985) discusses the parametric family of power transformations which may be used. The drawback here is the interpretation which may be given to such *non-linear* transformations, bearing in mind that the price-earnings model tested here is derived from a *linear* mapping from accounting earnings to prices. Although non-linear mappings are feasible (Garman and Ohlson, 1980, p. 421) it is not at all clear what the functional form would be and what other accounting variables would be involved.

Whilst further refinements to the estimating process should be investigated, the results here suggest that the White proposal is in fact adequate. Although it is possible that its power may not be sufficient in other disclosure contexts, discussions elsewhere are encouraging; for example, a recent (returns) market reaction paper by Offer and Siegel (1987) employs the technique. It is also suggested as a feasible solution in Bernard (1987) when a long time series of data is not available for his proposed technique concerning cross sectional dependence of market residuals.[13]

2. One advantage of the valuation method which is discussed here is that it does not need to identify the market's expectation of the disclosure. The experimental design could also be an advantage when there is no clear announcement day of the disclosure. However, this has not been tested. The price model has been estimated on the known announcement day of the historical and current cost earnings, the same day as used in the PSW returns study. Further work in this area should test, possibly by simulation, the sensitivity of both models to (i) measurement error in the announcement day and (ii) contexts in which disclosure takes place over a period of time.

In this study, we have not examined the relative econometric properties of price and returns models in the context of market reaction tests. What we have done is to show, for SSAP 16 disclosures, that parsimonious price models are sufficiently powerful and that ordinary least squares with the White correction can provide a suitable estimation technique.

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## Appendix

### The White Procedure

Formally, suppose in standard notation that

$$y = Xb + e$$

and

$$E(ee') = W. \tag{1}$$

Then, using OLS

$$\hat{b} = (X'X)^{-1}X'y \tag{2}$$

and

$$V(\hat{b}) = (X'X)^{-1}X'WX(X'X)^{-1}. \tag{3}$$

If

$$W = \sigma^2 I$$

then this collapses to the usual formula

$$V(\hat{b}) = \sigma^2(X'X)^{-1}. \tag{4}$$

Clearly, when $W \neq \sigma^2 I$, the use of (4) will provide a biased estimator of the true variance-covariance matrix in (3); nevertheless, (2) still provides a linear unbiased estimator of $b$. If $W$ were known, we could, of course, use (3) directly; however, when $W$ is non-scalar and unknown, White has provided a simple technique of estimating $W$ in order to generate a consistent estimator of $V(\hat{b})$.

The $(i, j)$th element of $W$, $w_{ij}$, is given by

$$w_{ij} = E\,(e_i e_j).$$

Although the true vector $e$ is unknowable, we do have an estimator in the OLS residuals, $\hat{e}$, given by

$$\hat{e} = Y - X\hat{b}.$$

Thus a natural candidate for estimating $w_{ij}$ is

$$\hat{w}_{ij} = \hat{e}_i \hat{e}_j.$$

In the case of heteroskedastic errors, $W$ is a diagonal matrix, and the White proposal amounts to estimating $W$ by a matrix whose typical diagonal element is $\hat{e}_i^2$ and whose off-diagonal elements are all zero. It may then be shown that, defining $\hat{W}$ by

$$\hat{W} = \{\hat{w}_{ij}\}$$

$$\hat{w}_{ij} = \begin{cases} \hat{e}_i^2 & i = j \\ 0 & \text{otherwise} \end{cases}$$

generates a consistent estimator of $V(\hat{b})$ through use of (3). Then

$$\hat{V}(\hat{b}) = (X'X)^{-1} X' \hat{W} X (X'X)^{-1}$$

where

$$\hat{V}(\hat{b}) \rightarrow V(\hat{b}).$$

The diagonal elements of $\hat{V}(\hat{b})$ then provide estimators of the variances of the coefficient estimators *which are robust to heteroskedasticity.*

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# Ex-Effects: Ex-Dividend–Ex-Rights Corroboration and the Implications for Valuation

**Ian R. Davidson**

**Abstract**—The absurd prescriptive implications of 'corner point' solutions to financing and dividend theories, based on conventional models of tax perturbation, have led to an explosion of models based on information asymmetry or agency theory. A third line of enquiry, which posits that due to fundamental effects the nature of market valuation itself may be altered by taxation and other frictions, has received less attention. This paper addresses the valuation issue from an empirical perspective. The point at issue is whether the incidence of taxation is passed through market prices, as the Chicago 'tight prior equilibrium' view would seem to imply (the 'conventional view', on which much of the theory of finance is based); or whether market prices in some way reflect the tax positions of the investing clientele (the 'capitalisation view'). The 'window' on the valuation process that is investigated empirically concerns the relationships between marginal market valuation changes for different ex-events, at the individual firm level. The interactions studied are (i) ex-dividend and ex-rights, and (ii) ex-final dividend and ex-interim dividend value changes. The results point to the absence of any statistical association between marginal value changes across different ex-events, lending little support to the simple tax-based clientele hypothesis.

## Introduction

Two polar viewpoints concerning the market valuation of funds retained within the corporate sector are the 'conventional' and the 'capitalisation' hypotheses. The conventional view (Bradford's 1981 terminology) assumes that £1 retained by the firm increases its market value by £1 (i.e. Tobin's '$q$', the ratio of market value to reproduction cost, is unity). Analyses of the dividend and public policy implications that reflect this assumption in most respects are found in King (1977), and Atkinson and Stiglitz (1980).

In contrast, the capitalisation view (Auerbach's 1979 terminology, although King 1977 presents an illuminating analysis of The Effects of Taxation on Valuation in his section 4.3) asserts that, under steady state assumptions, retentions are not capitalised on a £1 for £1 basis, but on a £$q$ for £1 basis where, under a classical corporate tax system, $q$ is strictly less than unity (i.e., in an equilibrium in which dividends are paid). More precisely, $q = (1 - t_m)/(1 - z)$ where $t_m$ is the tax rate of the representative investor, and $z$ is the effective rate of capital gains taxes. A similar position is arrived at by Bradford (1981), except that he assumes capital taxes to be zero. The intuition is straightforward, despite the complexity of the models. Provided direct transfers that circumvent the tax system are ruled out (such as share repurchase or cash take-over settlement), then any retention can be regarded as a deferred dividend. Under simplifying 'representative rate' arguments, this leads to the view that, under rational expectations, the market price should reflect the incremental tax liability on distribution (see Appendix 3).

The results from the short term 'ex-dividend' model of Elton and Gruber (1970) are reassuringly consistent with the capitalisation position, their ex-dividend statistic expression implying that the marginal 'q' across an ex-event has an identical explanation (in terms of tax rates) to Auerbach's average 'q' above. Since incremental taxes on distribution are capitalised in the market price (at least for the 'representative' or 'value determining' shareholder), it leads to a form of dividend indifference. Whereas this does not lead to a theory of dividends as such, it nevertheless provides some counter to the vexing puzzle of why dividends are paid at all under the discriminatory dividend taxation operated in the US. Elton and Gruber went on to demonstrate an apparent clientele effect in which marginal income tax rates appeared to decrease with increasing dividend yield. As is well known, the main weakness of this interpretation is that in the more realistic scenario of investors with heterogeneous tax rates, it is not clear that any share value could represent a conventional market

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clearing price (e.g. Lakonishok and Vermaelen, 1983, footnote 7, p. 1162).

The purpose of this paper is to provide some new evidence on the short-term ex-effect. A central question is whether the valuation effects arise from short-term trading pressures, or are indicative of longer term influences. In the next section, the cross-sectional relationship between ex-rights and ex-dividend events is studied, and also the relationship between the market value changes over different ex-dividend events for each firm. The hypothesis is that, if the ex-effect is a long-term capitalisation of investors' tax rates, then different ex-events for a given firm should be subject to similar valuation perturbations. This study finds no evidence for the uniformity of such valuation effects, either between different ex-dividend events, or between ex-rights and ex-dividend events. The conclusions are presented in the final section.

Given the low frequency of rights offerings in the US, and some difficulties with the data that were available, the study uses UK London Stock Market (LSM) share price information only.

## Ex-dividend ex-rights corroboration

### *Discussion*

Let $K_r$ be the marginal value of each pound received from a rights issue, and $K_d$ be the marginal value of each pound paid as dividend, both being measured over the short term by the cum- to ex-price transition.

$K_r$ is obtained as follows. Consider a rights issue of $m$ new shares for every $n$ held at the record date, at an issue price of $P_0$. The relation between the *ex-rights* price $P_x$, the last *cum-rights* price $P_c$, and the terms of the issue, for a given factor $K_r$, assuming the "$m$" shares are of the same class and have identical entitlements to the '$n$' shares which confer the rights, is:

$$P_x = (m \cdot K_r P_0 + n \cdot P_c)/(m + n) \qquad (1)$$

rearranging,

$$K_r = ((m + n) \cdot P_x - n \cdot P_c)/m \cdot P_0 \qquad (2)$$

This expression may be derived more rigorously as the limit of an option process as shown in Appendix 1.

$K_d$ is measured by the Elton and Gruber (1970) *ex-div* statistic:

$$K_d = (P_c - P_x)/d \qquad (3)$$

where $P_c$ is the last cum-dividend price, $P_x$ is the ex-dividend price (sampled at the end of the ex-div day), and $d$ is the dividend per share.

The '$K$' factors both for dividends and rights issues are referred to as 'capitalisation factors': they are a measure of the 'marginal Tobin's $q$' for the ex-event in question. If there is a consistent valuation 'filter effect' between the firm and the shareholder, then, for a given firm, the capitalisation factors $K_d$ and $K_r$ should be approximately equal (provided the time separation between the events is short). At the least, they should be positively associated in cross-section. Furthermore, a similar association should exist between the $K_d$ factors for adjacent ex-dividend events, on the basis that it is the annual yield that should determine the attractiveness of the share to any specific tax-induced clientele.

### *The Data*

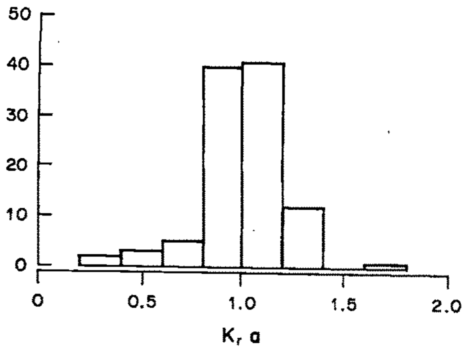
The target population consisted of all the rights issues from UK listed companies for the fiscal years 1984/5 and 1985/6 as recorded in the Dun and Bradstreet 'Stubbs Taxation Service' directory. Only 'simple' rights issues were selected. A simple issue is defined as one in which shareholders are entitled to purchase $m$ shares *of the same class* for every $n$ held at the record date. Furthermore, any unexercised rights were to be sold by the firm and the proceeds distributed, to ensure that there was an expectation of full subscription. Finally, the data were checked to ensure that the issue price did not exceed either the subsequent cum- or ex-rights market prices.

The effect of the above restrictions was to reduce the sample to about one half of the rights issues listed, resulting in a sample of 104. The major factor causing the sample reduction was that some of the rights issues were extremely complex, involving different classes of shares, bonds, warrants and other securities. The sample is not very large, but it was carefully screened and it is considerably larger than that used by White and Lustzig (1980) using US data (in 5 of the 9 years of their study, their sample size was in single figures).

The dividend information for each firm in the rights issue sample was also extracted from Stubbs. For the corresponding fiscal years, 92 of the 104 firms paid at least one dividend, and 80 firms paid two (the remainder paid none). Dividends were separated into interim and final where appropriate (those for firms that paid only one dividend being classified as final). The ensuing samples therefore consisted of 104 ex-rights events, 172 ex-div events, 92 paired ex-rights and ex-final-dividend events, and 80 paired ex-rights and ex-interim-dividend events.

Cum- and ex-share prices and the corresponding market indices (to control for general market movements) were extracted from the Financial Times (FT) Share Service data. One complication with the dividend data is that, under London Stock Exchange rules, shares are required to go *ex-div* on the first day of an account. Since this is invariably a Monday, there is a weekend effect compounded in the share prices. Since there is no similar restriction for ex-rights dates, it was considered important to adjust all ex-prices for general market movements. This was accomplished by multiplying

**Figure 1**
**Distribution of Adjusted Kr Factors**



each ex-price by the ratio $I_c/I_x$, where $I_c$ is the appropriate market index at the time of the last 'cum' quotation, and $I_x$ is closing market index on the 'ex' day. This adjustment is somewhat crude in that it assumes equal responsiveness across stocks, but is unlikely to introduce any serious distortion.

*Rights Issues and the Ex-rights Effect*

Figure 1 shows the distribution of the capitalisation factor $K_r$ after simple adjustment of the ex-rights price for changes in the market index. This adjustment was found to make little difference to the values calculated, although it increased the standard deviation of the $K$ values from 0.186 to 0.198. The unadjusted $K_r$ values were found to have little statistical association with the index ratio $I_c/I_x$ (correlation coefficient = 0.051), and with the issue proportion $E_p$, defined below in equation (4) (correlation coefficient = 0.003).

The median market adjusted $K_r$ value was 1.000 and the mean 0.992 (standard error 0.018), so there appears to be little cause to reject the hypothesis that the mean value of $K_r$ is unity.

The following rationalisations are defensible:

(a) the Conventional View is correct. £1 subscribed generates an incremental value of £1, and all tax effects are passed through to the individual.

(b) the Capitalisation View is correct. The reason that the mean $K_r$ is approximately unity is fortuitous: it means that the tax rate of the value forming clientele happened, on average, to be close to the imputation rate of 30% over the sample period. (Under the capitalisation view, £1 of capital paid into the firm under an imputation system is immediately valued at $(1 - t_m)/(1 - t_p)$, ignoring capital gains tax, where $t_p$ is the standard rate of income tax which was 30% in both sample years—see Appendix 2.) In weak support of this view is the observation that the value of $K_r$ was not the same for all firms—the lowest value was 0.375 and the highest 1.638. The corresponding distribution of implied tax rates, shown in Figure 2, does not look implausible. Hence a tax-induced capitalisation effect cannot be ruled out at this stage.

It would appear that US data might have been of some help in distinguishing (a) and (b) since, on capitalisation assumptions, $K_r$ is constrained to be less than or equal to the conventional value of unity under a classical corporate tax system. In contrast, under the UK imputation system, the corresponding upper bound with a 30% imputation rate is $1/0.7 = 1.43$, which comfortably exceeds the conventional value of unity.

In ex-dividend studies, the relative magnitude of the dividend payment as captured by some measure of dividend yield is generally found to be associated statistically with the Elton and Gruber ex-div statistic. A broadly analogous scale factor for a rights issue is the proportion of new equity capital raised by an issue, say $E_p$, which can be expressed in terms of the ratio of the amount raised to the last cum-rights market capitalisation, viz:

$$E_p = m \cdot P_0/n \cdot P_c \tag{4}$$

The sample distribution of $E_p$ indicated that about 80% of the firms in the sample raised between 10% and 30% of their current market capitalisation. However, there is a very long right hand tail with some values beyond 100%. The $E_p$ values are much higher than the dividend yields for the firms in the sample, although under the simple capitalisation hypothesis, this scale factor should not have any consequence.

Since both the timing and monetary values of rights issues are unpredictable (in contrast to dividends), there is little reason *a priori* to expect a systematic clientele effect to be induced by rights issue expectations. Nevertheless, it seemed of interest to extend the Elton and Gruber grouping technique to rights issues, to investigate a possible

**Figure 2**
**Distribution of Implied Tax Rates from ex-Rights Price Changes (ignoring capital gains taxes)**

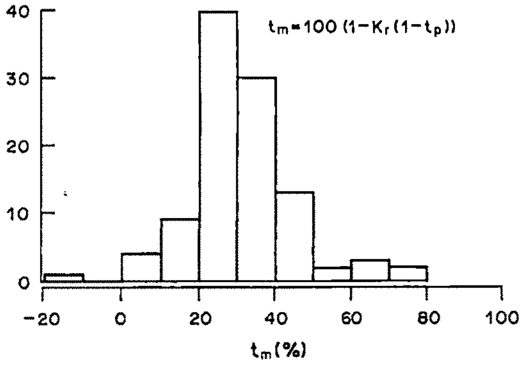
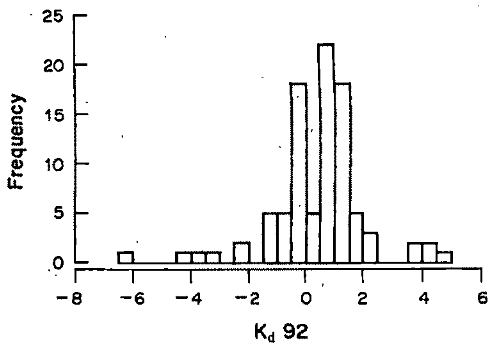


**Figure 3**
**Distribution of Kd Factors for Final Dividends**



association between $K_r$ and $E_p$. The ex-rights data were sorted into order of increasing $E_p$ values, and the sample (with the last 4 issues discarded to give a sample size of 100) was divided into deciles. The Spearman rank correlation coefficient between the group mean $E_p$ values and the group mean market adjusted $K_r$ values was 0.20, which contrasts with the higher value of 0.81 obtained between the grouped ex-dividend $K_d$ and the Financial Times annual dividend yield (a result consistent with the findings of Elton and Gruber; Kalay, 1982 and others). However, the fact that the ex-rights data hinted at any association at all is perhaps surprising. A possible explanation is that firms using high dividends as a signalling device have a greater requirement for new equity funds (the extra tax burden being a signalling cost as per Bhattacharya, 1979), so the ex-rights $K$-factors reflect the clientele phenomenon that appears to be present in the ex-dividend $K$-factors. However, the empirical results of the ex-dividend ex-rights corroboration below do not support such an association.

### *The Ex-dividend Effect*

Dividend taxes are complicated in the UK by the imputation system (Appendix 2). Provided the firm can offset its Advance Corporation Tax (ACT) against Mainstream Corporation Tax (MCT), then the net cost to the firm is the net dividend (ignoring timing differences). Under conventional arguments, £1 'lost' by the firm in paying a dividend should decrease the value of the firm by £1—hence it is the net dividend that is important and using this should result in a $K_d$ value of unity. This should also be true if there is irrecoverable ACT, on the basis that this should already be reflected, as far as it is public knowledge, in the cum-div price (and if it is not, it is unlikely that such information would be revealed just as the shares go ex-div). As reported in the 1982 Green Paper 'Corporation Tax', there was widespread tax exhaustion in UK companies, the difficulty in the present context being that there may be a dispersion of views about a given firm's precise tax position.

Under simple capitalisation arguments, it is the *gross* dividend multiplied by one minus the marginal tax rate of the value forming clientele (ignoring capital gains tax and the delay before offset of ACT) that would determine the valuation factor. The 'grossing up' of the dividend presents no particular problem: since the imputation rate is fixed at 30% over the sample period, it results in a simple scale factor adjustment to $K_d$. Under the imputation system (ignoring capital taxes), the 'no-arbitrage' value change is given by:

$$P_C - P_x = d\cdot(1 - t_m)/(1 - t_p) \qquad (5)$$

where $d$ is the net dividend. Hence the corresponding Elton and Gruber (1970) ex-div statistic ($K_d$) would be:

$$K_d \equiv (P_C - P_X)/d = (1 - t_m)/(1 - t_p) \qquad (6)$$

from which the implied marginal tax rate can be obtained on rearrangement.

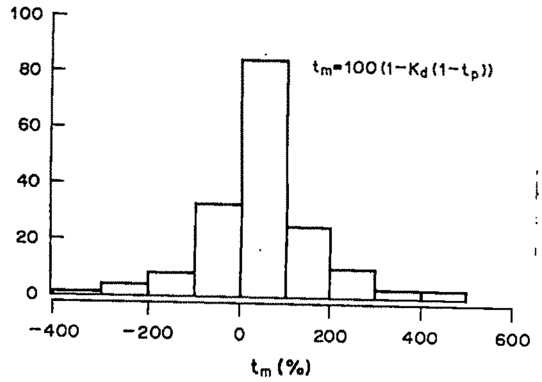
The observed dispersion of the $K_d$ values for both dividend subsets is high, especially for the interim dividends. This results in a number of outliers which appear ridiculous in terms of any purely tax based interpretation. Figure 3 shows the distribution of $K_d$ for the 92 final dividend events. The significant number of negative values relate to firms whose share price increased on going ex-div: for example, the share price of Systems Designer plc *increased* from 740p to 750p on going ex-div with a dividend of 1.6p per share. Even after adjustment for the market index, a $K_d$ value of −5.27 was obtained. At the other end of the scale, the price of shares in the Commercial Bank of Wales changed from 130p to 120p with a dividend of only 2.125p. Given this dispersion, the mean values need to be treated with caution. The summary statistics are as follows:

*$K_d$ Valuation Factor Statistics*

| | *Final Dividends* | | *Interim Dividends* | |
|---|---|---|---|---|
| | *unadj* | *adj* | *unadj* | *adj* |
| Sample | 92 | 92 | 80 | 80 |
| Mean | 0.49 | 0.51 | 0.54 | 0.93 |
| Median | 0.74 | 0.77 | 0.74 | 1.01 |
| S. Dev | 1.61 | 1.63 | 2.07 | 1.81 |
| S. Error | 0.168 | 0.170 | 0.231 | 0.202 |
| Upper quartile | 1.24 | 1.22 | 1.31 | 1.86 |
| Lower quartile | 0.00 | −0.03 | 0.00 | 0.26 |

(Note: 'adj' refers to the adjustments of the ex-div price for general market movements.)

**Figure 4**
**Distribution of Implied Tax Rates from ex-Dividend Price Changes (ignoring capital gains taxes)**



The mean values are significantly different from unity at the 1% level for the final dividends, and at the 5% level (just) for the unadjusted interim dividends, but not for the adjusted interim dividends. These results seem to be generally in accord with those of previous studies, in that there is reasonable but not conclusive evidence that the central location of $K_d$ is less than unity. The mean values are close to the estimates from the implied fall-off values in UK option prices obtained by Kaplanis (1986, p. 417).

The interpretation in terms of marginal tax rates seems less secure than for the ex-rights events. Under the capitalisation view, with capital gains tax at an effective rate $z$, the implied marginal tax rate under an imputation system is given by:

$$t_m = 1 - K_d(1 - t_p)(1 - z) \qquad (7)$$

Even with $z = 0$, given $t = 0.3$, a $K_d$ value of 0.51 (mean of market adjusted final-dividend-$K_d$) the implied marginal tax rate is very high at 64.3%. This is consistent with the observation by Poterba and Summers (1984) that implied tax rates outside the US seem to be very high. However, this is a mean value from a very noisy distribution as illustrated in Figure 4, and is made up of instances where the implied tax rate is considerably higher than 100% as well as instances where it is less than zero. Whereas both the conventional view and the simple capitalisation hypothesis appeared plausible in respect of ex-rights events, neither appears to be consistent with the ex-dividend evidence.

### *Ex-dividend, Ex-rights Corroboration*

If there is a persistent tax-based capitalisation effect, there should be a positive relation between the K-factors of ex-dividend and ex-rights events at the individual firm level. However, the scatter of market adjusted $K_d$ values against the adjusted $K_r$ values for the final dividend sample of 92 showed no evidence of any systematic relationship (Figure 5).

More surprising was that the $K_d$ factors for the final and interim dividend events were virtually independent. These are labelled $K_{d1}$ (final) and $K_{d2}$ (interim) in the following simple correlation matrix, which also includes $K_r$.

Correlation Matrix of Adjusted K-factors

| | $K_r$ | $K_{d1}$ | $K_{d2}$ |
|---|---|---|---|
| $K_r$ | 1 | 0.097 | −0.221 |
| $K_{d1}$ | 0.097 | 1 | 0.065 |
| $K_{d2}$ | −0.221 | 0.065 | 1 |

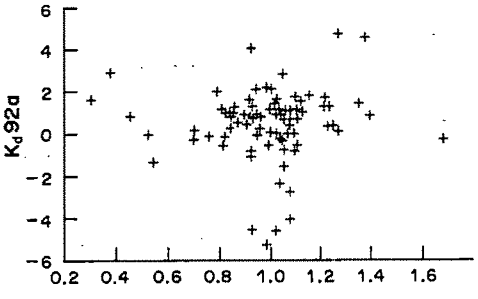
(Note: the correlations of the unadjusted K-factors were similar.)

At the 1% level, a correlation of ±0.03 is statistically significant. However, these results do not give any confidence in the strength of association of the perturbation effect across ex-events. The most significant correlation is actually negative—an outcome that is highly implausible under capitalisation arguments. A standard hypothesis test for equality of means for each pair of samples shows that only equality of the mean of $K_r$ and the mean final $K_d$ can be rejected at the 5% level ($z = 2.96$). The differences between the means of the other pairs is not statistically significant largely due to the high dispersion of the $K_d$ distributions.

## Conclusions

The lack of any association of the $K$-factors between different ex-events is consistent with the conventional view. However, whereas the rights issue K-factor does appear to be centred around

**Figure 5**
**Market Adjusted Kd (final dividend) versus Market Adjusted Kr**



unity, this is not the case for the ex-dividend K-factor, suggesting that the conventional view is not appropriate in the latter case. The capitalisation view fares worse, in the sense that there is no evidence that at the individual firm level the valuation perturbation persists across different ex-events.

It is important to recognise that this study only addresses short-term ex-effects, and the results should not be interpreted as implying that a longer term capitalisation effect is absent. Indeed, there is considerable literature that points to a dividend yield effect in Capital Asset Pricing Model studies (e.g. Rosenberg and Marathé, 1978; Litzenberger and Ramaswamy, 1979, 1980, 1982). If a longer term effect is present, this study suggests that value implications of short term ex-effects and longer term influences may differ. This is corroborated by a number of findings reported elsewhere, e.g. the high trading volume on the ex-date relative to four days prior noted by Booth and Johnson (1984), and more especially the evidence on the periodicity of abnormal returns centred on the ex-date found by Charest (1978). The main implication of the present study is that it provides further evidence that questions the central importance of the simple tax perturbation hypothesis of ex-effect value changes.

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## Appendix 1

### The Ex-rights Capitalisation Factor $K_r$

Let $V$ be the net value of a right, then:

$$n \cdot P_x + m \cdot V = n \cdot P_c \qquad \text{(A1.1)}$$

where $P_x$ is defined for this purpose as the equivalent ex-rights value of the stock. Defining $K_r$ as the pure value perturbation at time $t$ (excluding any discounting effect), and making the simplifying assumption that it is non-stochastic, then each right should have the value of a (European type) call option on the equivalent ex-rights value of the stock, with effective exercise price $X = K_r \cdot P_0$, i.e.,

$$V = P_x \cdot N(d_1) - \exp(-rt) \cdot K_r \cdot P_0 \cdot N(d_2) \qquad \text{(A1.2)}$$

where $d_1$ and $d_2$ are the standard Black and Scholes (1973) arguments for $P_x$ and $X$ as defined, and $r$ is the risk-free rate of interest.

Substitution and rearrangement gives:

$$K_r = \frac{[n + m \cdot N(d_1)]\, P_x - n \cdot P_c}{\exp(-rt) \cdot P_0 \cdot N(d_2)} \qquad \text{(A1.3)}$$

Provided $P_x$ comfortably exceeds $P_0$, and the time $t$ to the exercise date is short, then by the remainder theorem,

$$\begin{aligned} \exp(-rt) &= 1 - rQ \quad t > Q > 0 \\ &\simeq 1 \end{aligned}$$

and both $N(d_1)$ and $N(d_2)$ approach unity, with the result that expression 2(a) reduces to equation 2. For present purposes, this limiting form is acceptable since the exercise date follows on closely from the ex-rights date. However, in general, the use of the simple ex-rights formula may be misleading if the time to exercise is appreciable, since it fails to value satisfactorily the option element attaching to the cum-rights share.

## Appendix 2

### The UK Imputation Tax System

Since 1973 the UK has operated an imputation tax system which attempts a partial integration of personal and corporate taxes. Dividends paid are assumed to have suffered basic rate tax deduction at a rate $t_p$, further tax being payable by the individual only if his or her marginal rate $t_m$ exceeds $t_p$ (if $t_m$ is less than $t_p$, then relief can normally be obtained for the excess tax deemed to have been paid).

If the firm pays a dividend of $d$ to an individual, the (gross) dividend assumed to have been received by the shareholder is $d/(1-t_p)$. A prepayment of tax (Advance Corporation Tax) of $t_p$ times this amount is paid by the company to the Inland Revenue, the shareholder receiving the net amount plus a tax credit equal to the tax payment. The gross dividend is assessed to tax at the shareholder's marginal rate $t_m$, the tax credit being deducted from the total tax payable. Thus the investor effectively receives, net of all taxes, $d(1-t_m)/(1-t_p)$.

Thus the firm pays $d$ to the individual, and $d \cdot t_p/(1-t_p)$ (i.e. an amount equal to the imputed tax credit) to the Inland Revenue as Advance Corporation Tax (ACT). However, this latter amount can normally be set off against the main corporate tax bill (assessed on profits) that is paid some months later, so the net cost to the firm of supplying the dividend is $d$. Effectively, a dividend of $d$ paid by the firm results in the shareholder receiving a pre-personal tax dividend of $d/(1-t_p)$. Over the sample period of this study, the basic rate $t_p$ was 0.3 (30%).

The implication for the Elton and Gruber ex-div statistic is that an arbitrage free cum to ex transition should reflect the following composite tax term:

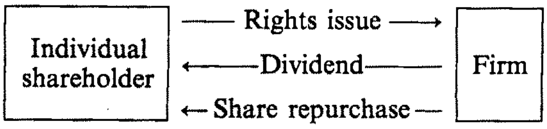
$$(P_C - P_x)/d = (1-t_m)/(1-t_p)(1-z)$$

where $z$ is the effective rate of Capital Gains Tax (CGT). Since CGT is levied on realisation and not on accrual, is assessed on the net indexed gain after allowance for losses, and substantial annual exemptions are granted to individuals, it was assumed to be zero in inferring marginal tax rates in the main text.

## Appendix 3

Consider the direct ways in which funds can be transferred between shareholders and the corporation:

*Movement of Funds*



The conventional hypothesis is that each £1 retained by the firm increases its market value by £1, irrespective of the structure of personal taxes—hence the full incidence of personal taxation falls on the individual shareholder. Thus every £1 subscribed (by a rights issue) should increase the value of the firm by £1, and every £1 paid as dividend should decrease the value by £1.

Ignoring share repurchase for the moment, the capitalisation hypothesis asserts that, since the eventual transfer of funds from the corporate sector to shareholders requires the payment of dividend, the valuation of funds retained in the corporate sector should rationally reflect the eventual tax liability on distribution. Thus retained funds are not valued on a £1 for £1 basis (except as a special case), but on a £$K$ for £1 basis, where $K$ is a composite term reflecting personal tax rates. Again the effect should be symmetric, in the sense that funds subscribed (rights issue) should be perturbed in the same way as funds paid out (dividend).

Share repurchase complicates the picture, since this largely circumvents the personal tax system (leaving only a liability to capital gains tax). However, share repurchase is rare in the UK, except that a cash settlement on takeover is effectively a share repurchase (and may be a very desirable option for some shareholders). Share repurchase is not considered explicitly in this paper.

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# Modelling the Accounting Information Requirements of Small Businesses

Scott Holmes and Des Nicholls*

**Abstract**—Studies in various locations have indicated that practising accountants are an important source of advice and information to the small business sector. However, prior research has concentrated on establishing a relationship between the two parties and in ascertaining the extent of services provided. This paper highlights the limited acquisition or preparation of detailed accounting information by Australian small business owner/managers. Operating and environmental variables which influence the preparation or acquisition of detailed accounting information are established and logistic regression techniques used to estimate an appropriate explanatory model, from which estimates of the probability that a firm, with particular attributes which are reflected in the explanatory variables in the model, will prepare or acquire a given level of accounting information.

## Introduction

Small business owner/managers rarely have ready access to all of the information necessary to conduct the many aspects of their business operations effectively. Recent studies in various locations (Fargher, 1971; Back, 1978; Glen, 1980; Page, 1984; Peacock, 1985; Carsberg *et al.*, 1985) have indicated that practising accountants are an important source of advice to small business, which is defined for the purpose of this paper as a business with a maximum of twenty employees (including owners), which represents over 90% of businesses operating in the private sector. However, investigation of the factors which determine the information requirements of small business has been limited.

This paper investigates the degree of preparation/acquisition of accounting information by small business owner/managers for use in making business decisions. Factors (or variables) influencing the preparation of accounting information are examined. Various explanatory variables are then used to develop and estimate a logistic regression model from which the probability that a small business will prepare/acquire statutory, budget and additional accounting information is estimated. The estimates produced are of particular relevance and use to the accounting profession, as will be demonstrated in the fourth section.

## Survey details

The quantitative information summarised and analysed in this paper has been obtained from a large scale survey of Australian small businesses conducted in mid-1986. The questionnaire was pilot tested on 100 small businesses in late 1985. This assisted in developing the methodology for the large-scale survey (for further information on the pilot study and subsequent results, see Holmes, 1986). The survey questionnaire was principally designed to obtain information from small business owner/managers relating to the accounting information either produced within the firm or sought externally from practising accountants.

In devising the sample frame of firms the aim was to obtain a coverage in a number of different locations and across the majority of industry groups. Accordingly, a stratified sample of 3,780 small independent enterprise units was selected, consisting of 180 firms from each of the seven industry groups (as classified by the Australian Bureau of Statistics) in three locations (Sydney, Melbourne and Brisbane). The sample was not divided on a proportionate basis (based upon the total small business population per location) as the overall sample size was too small, when compared to the total population, to justify such an approach. Some 17% of the original sample were found to be 'dead' listings, so that the effective number of small firms surveyed was 3,140. Usable questionnaires were returned by 928 firms, which represents a response rate of about 30 percent. Tests for possible non-response bias were conducted, the details of which are summarised in Appendix 1.

## Accounting information and logistic regression models

### *Accounting Information*

The owner/managers were asked to indicate the information prepared either by the business or an external accountant (at least annually). The responses listed in Table 1 indicate that the majority of respondents prepare or acquire a 'tax return' (as required by the Income Tax Assessment Act) and/or statutory accounts (as required by the Companies Act or Code). Information of a non-statutory nature (broadly classified as 'additional') is sought externally by a relatively small number of respondents. From an inspection of the data in Table 1, it would appear that there is a significant difference between the internal and external preparation of accounting information. In order to check the hypothesis that there is a significant difference between the type of information prepared internally, as opposed to acquired externally, tests of equality of proportions were carried out, the tests being based on the normal distribution (see Walpole, 1974). The test statistic, in each case, is denoted by $z$ given in the last column of Table 1, where an asterisk on a value indicates significance at the 95% level. That is, a significant value indicates that, with 95% confidence, the two proportions are significantly different from each other.

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*The authors are, respectively, Senior Lecturer and Touche Ross Fellow at the University of Queensland, and Reader at the Australian National University. They thank two anonymous referees for comments.

From the results of this testing procedure based on the test statistics in Table 1, it follows that a significantly greater proportion of small business owner/managers seek statutory and budgeted information from an external accountant, rather than prepare the information within the business, whilst the reverse situation exists for additional information. These results support the conclusion that statutory information is predominantly sought from external accountants, whereas additional information, if prepared, tends to be prepared within the business. It is apparent from the summarised results in Table 1 that the level of preparation of information, other than statutory, is limited. Indeed, with the exception of profit and loss budgets (for which 26.6% are sought externally), not one category of budget or additional information prepared either internally or externally exceeded 21% of the respondents.

### *Logistic Regression Models*

Few owner/managers prepare or acquire accounting information, other than statutory reports and to some extent budgets (based on statutory accounting information). This section of the paper outlines the influence of certain environmental and

**Table 1**
**Accounting Information Prepared Externally or Internally (at least annually)**

| | *Total Responses* | | | | |
|---|---|---|---|---|---|
| | *Internal* | | *External* | | |
| *Information* | # | % | # | % | $z$ |
| *Statutory* | | | | | |
| Tax Return | 71 | 7.7 | 824 | 88.8 | 34.92* |
| Statutory Accounts | 90 | 9.7 | 480 | 51.7 | 19.59* |
| Balance Sheet, Profit/Loss Stat. | 135 | 14.5 | 643 | 69.3 | 23.93* |
| *Budget* | | | | | |
| Profit/Loss | 158 | 17.0 | 247 | 26.6 | 5.00* |
| Cashflow | 191 | 20.6 | 151 | 16.3 | 2.39* |
| *Additional* | | | | | |
| Ratio Analysis | 69 | 7.4 | 46 | 5.0 | 2.14* |
| Manufacturing Statement | 56 | 6.0 | 24 | 2.6 | 3.61* |
| Interfirm Comparison | 55 | 5.9 | 25 | 2.7 | 3.40* |
| Industry Trends | 64 | 6.9 | 13 | 1.4 | 5.93* |
| Source & Application of Funds | 93 | 10.0 | 71 | 7.7 | 1.74 |
| Break-even Analysis | 114 | 12.3 | 39 | 4.2 | 6.33* |
| Cashflow Statement | 190 | 20.5 | 75 | 8.1 | 7.61* |
| Production Reports | 96 | 10.3 | 13 | 4.3 | 5.45* |
| Job Costing Reports | 171 | 18.4 | 22 | 2.4 | 11.43* |

*Note:* The non-critical region from the tables of the normal distribution constitutes those values of $z$ for which $|z| < 1.96$ at the 95% level of significance. Those calculated values of $z$ which lie in the critical region are denoted by an asterisk. Thus, except for source and application of funds, all these values are significant. This supports the hypothesis that there is a significant difference between the type of information prepared internally as opposed to externally. Hence, support is found for the alternative hypothesis, where the null is that the proportion of firms in each of the two categories should be equal.

operating variables upon the decision by owner/managers to access 'additional' information. Such variables have been partially identified in previous research (see, for example, Brodribb, 1967; Fargher, 1971; Mirza, 1984), but no attempt has been made to examine the interrelationship of the variables cited, which is the subject of the modelling procedures presented in this section.

A difficulty arose in quantifying accounting information. However, in order to test the relationship between the 'explanatory' variables, accounting information was divided into three groups, based on the classifications used in Table 1:

(i) Statutory (ST)—required by legislation; predominantly returns required for government authorities, such as the Australian Taxation Office and the Corporate Affairs Commission.
(ii) Statutory/Budget (SB)—ST and budgeted information.
(iii) Statutory/Budget/Additional (SBA)—SB and additional accounting information: businesses that prepare or acquire at least three 'additional' items of information, as classified in Table 1.

From the results of the survey the following variables appear to have a significant influence upon the acquisition or preparation of such information:

(a) *Business size.* The level of accounting information prepared or acquired is to some extent dependent on business size, as measured both by number of employees and turnover. As business size increases, so does the proportion of businesses preparing or acquiring SBA.

(b) *The number of years the business has been operating under existing management.* Significantly more businesses which are less than ten years old acquire or prepare SBA, as opposed to those businesses in the 11–20 years age bracket.

(c) *Industrial sector.* The industrial sector in which a business operates and the amount of accounting information prepared or acquired are related. Basically, a significantly greater proportion of businesses from the manufacturing, wholesale, business/finance and service sectors tend to prepare or acquire SBA, when compared to the proportion of businesses from the remaining sectors.

(d) *The education of a business' owner/manager.* A significantly greater proportion of owner/managers who stayed at high school for 5–6 years and/or attended university or college, prepare or acquire SBA, as opposed to those owner/managers leaving school on or before their fourth year, attending technical college or with no tertiary qualifications.

The relevant cross-tabulations are presented in Appendix 2. This data has been presented here since it may prove useful to researchers interested in undertaking further empirical research. There may of course be variables which have not been identified that may significantly affect the extent of the accounting information prepared or acquired by a firm. In fact, in the course of preparing the model presented in this section, several such variables were examined (see Appendix 3), but were not found to have a significant influence.

The analysis undertaken on the data presented in Appendix 2 indicated a relationship between the quantity of accounting information prepared or acquired by owner/managers and a number of explanatory variables. This led to the estimation of a model which relates the probability that owner/managers prepare or acquire certain accounting information (SBA) to the explanatory variables identified.

An exploratory data analysis and model selection procedure for the data of the present study determined the most appropriate model to be based on logistic modelling techniques. Logistic regression consists of forming a linear model for the logarithm of the odds ratio. If the probability of a firm preparing or acquiring a certain level of accounting information is given by $P$, the logarithm of the odds ratio, $y$, is given by:

$$y = \log\left(\frac{P}{1-P}\right) \tag{1}$$

The reason for considering the odds ratio, is that for a particular value of $y$, $P$ is guaranteed to lie in the range $0 \leqslant P \leqslant 1$; a requirement of all probability measures. For the model chosen, the logarithm of the odds ratio (i.e. $y$) is regressed against those explanatory variables which are (statistically) most significant in explaining the variation in $y$. The explanatory variables used vary, of course, with each logistic model, in relation to the significance of the variable in explaining the variation in $y$ (for detailed information on logistic regression see Hanusheck and Jackson, 1977 or Dobson, 1983).

Of the variables listed in Appendix 3, the explanatory variables appropriate for a model structured to estimate the preparation or acquisition of SBA were found to be turnover, management training, industry group, period the business has been operating under existing management, and number of employees. Consequently, the model can be written in the form:

$$y = C + \sum_{i=1}^{7} a_i T_i + 6TR + \sum_{i=1}^{6} d_i I_i + \sum_{i=1}^{5} e_i B_i + \sum_{i=1}^{2} f_i E_i + a \tag{2}$$

where the dichotomous explanatory variables are:

*Ti*, $i = 1, \ldots, 7$ represent turnover categories, so that, for example, if a business is in turnover category 5, $T_5 = 1$ and all other $T_i = 0$;

*TR* indicates whether or not the owner has sought management training since entering business; $TR = 1$ if 'NO', $TR = 0$ if 'Yes';

$I_i$, $i = 1, \ldots, 6$ represent the industry group categories;

$B_i$, $i = 1, \ldots, 5$ represents business age (under existing management);

$E_i$, $i = 1, 2$ represents the number of employees category.

*a* is the stochastic disturbance term representing that part of *y* which is unexplained by the other variables.

The *c*, $a_i$, *b*, $d_i$, $e_i$ and $f_i$ are coefficients to be estimated. The estimates for each category of variable are summarised in Appendix 4, along with their associated standard errors and *t*-statistics. The method used is Maximum Likelihood Estimation (MLE), where the probability of the observed data, using the logistic model, is maximised over the unknown parameters. That is, the values chosen for the unknown parameters are those which make our observed data most likely under the logistic model.

From Appendix 4 it can be seen that the estimates for the categories in both turnover and age are monotonic. This indicates that in the case of turnover, the lower the level of turnover the less will be the effect of this variable on the probability that a small business will seek SBA. For business age the inverse is true, namely the younger the business the more likely it is to seek SBA. While the modelling procedure is correct, current research is being undertaken in an attempt to refine the model developed in a number of ways, one of which includes an investigation of whether or not turnover and business age can be better represented by a functional form, which can then be taken into account in the model. If such form exists the predictive ability of the model may be improved.

There are a number of ways of validating the model, one of which is based on a holdout sample, the other is by means of a sensitivity analysis. The latter approach was followed here and the model was found to give a satisfactory fit. A detailed discussion of sensitivity analysis would detract from the main theme of the paper. Basically, sensitivity analysis is a diagnostic procedure based on the proportion of correct predictions and the total proportion of incorrect predictions by the logistic model. The interested reader is referred to Pregibon (1981), Landwehr, Pregibon & Shoemaker (1984) and Kay & Little (1986) for a discussion of logistic regression diagnostics, including sensitivity analysis.

## Application of the model

In order to demonstrate the use of the estimated model in Appendix 4, suppose we have a business for which:

$T$ = Turnover group 2 (\$50,001–\$100,000)
$TR$ = Yes (training course attended)
$I$ = Industry group 3 (construction)
$B$ = Business age group 4 (11–20 years)
$E$ = Number of employees group 1 (0–5 employees)

From Appendix 2 it follows that:

$$\hat{y} = -0.153 - 1{,}617 - 0.082 + 0.58 = -1.272$$

This is the estimate of the odds ratio, i.e.

$$\hat{y} = \log\left(\frac{\hat{p}}{1-\hat{p}}\right)$$

Consequently,

$$\frac{\hat{p}}{1-\hat{p}} = e^{-1.272} = 0.28$$

$$\text{so that } \hat{p} = \frac{0.28}{1+0.28} = 0.219$$

(95% confidence interval [0.124, 0.358]).

That is, there is an estimated 21.9% probability that a business with the above characteristics acquires or prepares SBA.

If a business has the same characteristics as those described, except that the business's owner/manager has not undertaken any formal management training since entering business, then:

$$\hat{y} = -0.153 - 1.617 - 0.833 - 0.82 + 0.58 = -2.105$$

Consequently,

$$\frac{\hat{p}}{1-\hat{p}} = e^{-2.105} = 0.122$$

$$\text{so that } \hat{p} = \frac{0.122}{1+0.122} = 0.109$$

(95% confidence interval [0.059, 0.192])

The result implies that a business with the same characteristics, except that the owner/manager has not attended management training, has an estimated 11% less probability (0.219 − 0.109) of preparing or acquiring SBA. Alternatively, if we take the same business as described initially (with management training), except that the firm belongs to a different industry group, say group 4 (wholesale trade), then for this business:

$$\hat{y} = -0.153 - 1.617 - 0.493 + 0.58 = -1.683$$

From this it follows that:

$$\hat{p} = 0.157$$

(95% confidence interval [0.080, 0.284])

Therefore, a business with the same characteristics, but operating in a different industry group, has an estimated 6.2% less probability of preparing or acquiring SBA than in the first example.

As shown by means of these examples, the model developed can be used as a means of estimating the level of accounting information that a business with specific characteristics is likely to prepare or acquire. The results obtained from application of the models are considered to be of particular relevance to practising accountants (provided the data is regularly updated), since most accounting practices rely on small business clients for the majority of professional fees, and because of the concentration of large clients among large international practices.

If accountants wish to increase the present level of services provided to their small business clients, a model such as that proposed here may be of some assistance in determining from where the demand for services will be forthcoming. This should result in a reduced level of wastage of resources, in that the marketing of services will not be concentrated on businesses with a low probability of acquiring additional accounting information. That is to say, the model could be used to 'target' groups of possible information users. Also, an increased awareness of the variables influencing the preparation or acquisition of accounting information may prove useful to marketing approaches taken by practising accountants.

## Conclusion

This paper has considered the information prepared or acquired by small business owner/managers. The results of the large scale surveys indicated limited preparation of 'additional' accounting information, with the predominant form of accounting information sought being statutory returns. Tests of independence revealed that whilst most owner/managers engage a practising accountant to prepare statutory accounts, additional information (of a non-statutory nature) tends to be prepared within the business, rather than sought externally. These results led to an investigation of the variables which have a significant influence upon the acquisition or preparation of accounting information. Exploratory data analysis established explanatory variables to be used in the development of an estimation model. This led to discussion of possible applications of the logistic regression model developed which can be used to assist accountants to 'target' groups of information users.

To date, it would appear that no other research in the area has attempted to determine systematically the variables influencing the acquisition or preparation of information by the small business sector, and as such this paper provides detailed insight into the small business/accounting information relationship.

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## Appendix 1 Examination of possible non-response bias

A test (based on the chi-square distribution) was conducted for each question on the questionnaire between 'early' (responded prior to a follow-up letter) and 'late' respondents (responded after a follow-up letter), so as to test for possible non-response bias. The test assists in determining whether there is a significant difference in the responses to the survey questions between those businesses that responded and those who failed to respond. Oppenheim (1966, p. 34) describes this test as a commonly accepted technique for testing 'early' and 'late' responses for non-response bias:

> . . . respondents who send in their questionnaires very late are roughly similar to nonresponders.

The test indicated significant differences for several questions from the Sydney survey. No significant differences were found for Melbourne and Brisbane. Non-respondents from Sydney (assumed equivalent to late responders) can be broadly described as follows:

Non-respondents do not consider financial statements to be particularly useful in assisting business decisions; the overriding purpose for financial statements is to satisfy taxation requirements.

The possible reason for their non-response may be that they feel the majority of questions are not applicable to them, in that they make limited use of financial statements.

Overall, the non-response rate is not considered to detract from the results achieved, in that differences between late and early responses largely relate to a certain type of question. The late respondents found less use in financial statements for business decision making than those (which are the majority of total respondents) who responded without the prompting of a follow-up letter. However, the potential effects of any bias must be kept in mind when interpreting the data and results of tests based on this data. It is important to keep in mind that such a conclusion can never be certain without information relating to the total population from which the sample is drawn.

## Appendix 2 Explanatory variables: cross-tabulations

**Table 2 (a)**
**Accounting Information and Business Size—Number of Employees**

| *Accounting Information* | *Employees* ≤5 # | % | 6–10 # | % | 11–20 # | % | Total # |
|---|---|---|---|---|---|---|---|
| SBA | 141 | 21.2 | 66 | 50.4 | 56 | 55.4 | 263 |
| SB | 149 | 22.4 | 31 | 23.7 | 25 | 24.8 | 205 |
| ST | 376 | 56.6 | 34 | 26.0 | 20 | 19.8 | 430 |
| Total | 666 | | 131 | | 101 | | 898 |

**Table 2 (b)**
**Accounting Information and Business Size—Turnover**

| *Accounting Information* | *Turnover ($'000)* <50 # | % | 50–100 # | % | 100–300 # | % | 300–600 # | % | 600–1000 # | % | >1000 # | % | Total # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SBA | 18 | 9.5 | 26 | 17.3 | 65 | 32.8 | 35 | 39.8 | 39 | 50.0 | 60 | 51.7 | 243 |
| SB | 33 | 17.5 | 36 | 24.0 | 52 | 26.3 | 20 | 22.7 | 20 | 25.6 | 21 | 18.1 | 182 |
| ST | 138 | 73.0 | 88 | 58.7 | 81 | 40.9 | 33 | 37.5 | 19 | 24.4 | 35 | 30.2 | 394 |
| Total | 189 | | 150 | | 198 | | 88 | | 78 | | 116 | | 819 |

**Table 2 (c)**
**Business Age and Accounting Information**

| *Accounting Information* | *Age (years)* <3 # | % | 3–5 # | % | 6–10 # | % | 11–20 # | % | >20 # | % |
|---|---|---|---|---|---|---|---|---|---|---|
| SBA | 37 | 33.3 | 59 | 33.5 | 74 | 33.5 | 46 | 21.6 | 34 | 24.1 |
| SB | 25 | 22.8 | 42 | 23.9 | 41 | 18.6 | 49 | 23.0 | 38 | 27.0 |
| ST | 49 | 44.1 | 75 | 42.6 | 106 | 48.0 | 118 | 55.4 | 69 | 48.9 |
| Total | 111 | | 176 | | 221 | | 213 | | 141 | |

**Table 2 (d)**
**Accounting Information and Industrial Sector**

| *Accounting Information* | *Industrial Sector*<br>*Manuf.* # | % | *Trans.* # | % | *Constr.* # | % | *Whole* # | % | *Retail* # | % | *Bus/Fin* # | % | *Service* # | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SBA | 68 | 43.6 | 14 | 13.1 | 37 | 24.5 | 48 | 35.0 | 17 | 16.2 | 42 | 35.3 | 35 | 29.9 |
| SB | 26 | 16.7 | 20 | 18.7 | 37 | 24.5 | 47 | 34.3 | 22 | 21.0 | 26 | 21.8 | 25 | 21.4 |
| ST | 62 | 39.7 | 73 | 68.2 | 77 | 51.0 | 42 | 30.7 | 66 | 62.9 | 51 | 42.9 | 57 | 48.7 |
| Total | 156 | | 107 | | 151 | | 137 | | 105 | | 119 | | 117 | |

**Table 2 (e)**
**Accounting Information and Owner/Manager Education**

*Level of Education*
(*a*) *High school* (*years*)

| *Accounting Information* | 1–2 # | % | 3–4 # | % | 5–6 # | % | Total # |
|---|---|---|---|---|---|---|---|
| ST | 74 | 59.2 | 144 | 50.0 | 142 | 37.9 | 360 |
| SB | 27 | 21.6 | 69 | 24.0 | 92 | 24.5 | 188 |
| SBA | 24 | 19.2 | 75 | 26.0 | 141 | 37.6 | 240 |
| | 125 | | 288 | | 375 | | 788 |

(*b*) *Tertiary*

| | *Trade* # | % | *Tech. College* # | % | *Uni/College* # | % | Total # |
|---|---|---|---|---|---|---|---|
| ST | 144 | 53.9 | 33 | 37.1 | 73 | 33.0 | 250 |
| SB | 64 | 24.0 | 27 | 30.3 | 53 | 24.0 | 144 |
| SBA | 59 | 22.1 | 29 | 32.6 | 95 | 43.0 | 183 |
| | 267 | | 89 | | 221 | | 577 |

**Table 2 (f)**
**Accounting Information and Owner/Manager Attendance at Management Training Programmes since Entering Business**

| *Accounting Information* | *Response*<br>Yes # | No # | Total # |
|---|---|---|---|
| ST | 150 | 269 | 419 |
| SB | 88 | 110 | 198 |
| SBA | 156 | 94 | 250 |
| Total | 394 | 473 | 867 |

## Appendix 3 Variables categorisation

| *Variable* | *Category* |
|---|---|
| SBA | 0 No |
| | 1 Yes |
| Business Structure | 0 No Answer |
| | 1 Sole Proprietor |
| | 2 Partnership |
| | 3 Company/Other |
| | 4 Trust |
| Business Age | 0 No Answer |
| | 1 <3 years |
| | 2 3–5 years |
| | 3 6–10 years |
| | 4 11–20 years |
| | 5 >20 years |
| Turnover | 0 No Answer |
| | 1 ⩽$50,000 |
| | 2 $50,001–$100,000 |
| | 3 $100,001–$300,000 |
| | 4 $300,001–$600,000 |
| | 5 $600,001–$1,000,000 |
| | 6 >$1,000,000 |
| | 7 Don't Know |
| Turnover Trend | 0 No Answer |
| | 1 Increasing Significantly |
| | 2 Increasing Moderately |
| | 3 Steady |
| | 4 Declining Slowly |
| | 5 Declining Rapidly |
| | 6 Fluctuating |
| Number of Employees | 1 0–5 |
| | 2 6–10 |
| | 3 11–20 |
| Secondary Education | 1 High school ⩽2 years |
| | 2 High school 3–4 years |
| | 3 High school 5–6 years |
| Tertiary Qualifications | 1 Trade |
| | 2 Technical |
| | 3 University/College /Other |
| Hours Worked/Week by Owner/Managers | 1 ⩽40 |
| | 2 41–60 |
| | 3 >60 |
| Management Training | 1 Yes |
| | 2 No/No Answer |
| Industry Group | 1 Manufacturing |
| | 2 Transport |
| | 3 Construction |
| | 4 Wholesale |
| | 5 Retail |
| | 6 Business/Finance |
| | 7 Service |

## Appendix 4 SBA estimated model

| *Variable* | *Coefficient Estimate* | *Standard Error* | *t-Statistic* |
|---|---|---|---|
| Constant | −0.153 | 0.412 | −0.37 |
| Turnover | | | |
| 2 | −1.617 | 0.362 | −4.46 |
| 3 | −1.117 | 0.334 | −3.34 |
| 4 | −0.457 | 0.287 | −1.59 |
| 5 | −0.506 | 0.309 | −1.64 |
| 6 | −0.158 | 0.317 | −0.50 |
| Training | | | |
| 2 | −0.833 | 0.182 | −4.58 |
| Industry | | | |
| 2 | −0.926 | 0.391 | −2.37 |
| 3 | −0.082 | 0.296 | −0.28 |
| 4 | −0.493 | 0.292 | −1.69 |
| 5 | −1.086 | 0.355 | −3.06 |
| 6 | −0.441 | 0.302 | −1.46 |
| 7 | −0.262 | 0.311 | −0.84 |
| Business Age | | | |
| 2 | 0.850 | 0.330 | 2.57 |
| 3 | 0.772 | 0.291 | 2.65 |
| 4 | 0.580 | 0.278 | 2.08 |
| 5 | 0.086 | 0.288 | 0.30 |
| Employment | | | |
| 2 | 0.782 | 0.243 | 3.22 |
| 3 | 0.989 | 0.295 | 3.35 |

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# Ex Ante Testing of Accounting Standards Using Stochastic Models

**W. P. Rees and C. M. S. Sutcliffe***

**Abstract**—Most previous studies of the effects of accounting standards have been conducted on an ex post basis. This paper explores a methodology for studying the implications of accounting standards prior to their introduction. As an illustration, the effects of alternative earnings recognition methods for long-term contracts were examined (SSAP 9). A stochastic model of a representative firm was constructed, where the underlying stochastic process was mean reverting. This model was then used to derive mathematical expressions for the earnings figures produced by different accounting procedures. The performance of these alternative accounting procedures was examined using the general criteria of prediction and closeness to economic income. The accounting procedures required by SSAP 9 emerged relatively well from these tests, and the methodology appears to offer the potential for development.

Most previous studies of the effects of accounting standards have been conducted after the implementation of the relevant standard. Such analysis can only contribute to the revision and not to the formulation of the standard concerned. This paper explores a methodology for studying the implications of accounting standards prior to their introduction. In consequence, a more informed debate may be permitted during the standard setting process.

The use of some strong assumptions permits the mathematical modelling of the fundamental effects of alternative accounting procedures, leading to the derivation of exact results. This analysis provides a foundation from which a variety of more realistic and complex models can be developed. The limitations imposed by the required assumptions clearly identify the constraints on this form of modelling, but also indicate the theoretical and practical developments required, and provide a base case against which subsequent progress can be evaluated.

This ex ante analysis of accounting standards involves the building of a stochastic model of the data generating process. To investigate the ability of this technique to produce results relevant to standard setters, it will be applied to a particular standard setting problem. The chosen case study is the potential implications for reported earnings when firms adopt alternative profit recognition rules for long-term contracts, i.e. as in Statement of Standard Accounting Practice (SSAP) 9.

This paper will proceed by briefly reviewing the standard setting process to examine the potential role for the ex ante analysis of accounting alternatives and to identify possible characteristics by which these alternatives might be evaluated. This is followed by a consideration of the development of SSAP 9, and the effects of this standard on earnings disclosure and on the behaviour of the earnings numbers produced. The stochastic model is then presented, the relationships between various income measures analysed and the alternative accounting policies compared according to various criteria. The final section presents conclusions on the choice of accounting policy and on the use of ex ante model building in the regulatory process.

## The standard setting process and desirable characteristics

One approach to standard setting is to specify a set of norms and to design standards which comply as far as possible with these prescriptions. This approach has run into considerable difficulty (Demski, 1973 and 1974; Cushing, 1977; Bromwich, 1980) and will not be pursued here. An alternative pragmatic approach, which has been used in this paper, is to identify information that may be required by policy makers for the evaluation of the economic consequences of alternative accounting procedures. These consequences may relate to decisions specific to the policy makers or more general considerations of prima facie significance.

Bromwich (1985) notes that, as regards the evaluation of economic consequences, 'presently consideration of these matters is generally based on armchair empiricism and on assertions based on the experience of individual committee members'. As most of the Accounting Standards Committee (ASC) members are involved with the preparation rather than the use of accounts, and since the costs of preparation are more easily evaluated than the benefits to users, preparation costs may receive a disproportionate weight in standard setting decisions. The choice between accounting options seems to be made on an ad hoc basis, and a generally agreed list of desirable characteristics does not exist. This paper will concentrate on two main features of accounting numbers: predictability and economic measurement.

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*The authors are, respectively, lecturer in accounting and Northern Society Professor of Accounting and Finance at the University of Newcastle-upon-Tyne. They wish to thank two anonymous referees, participants in the 1988 British Accounting Association annual conference and Rob Watson of UMIST for their helpful comments on earlier drafts. The authors also acknowledge the financial assistance received from the ICAEW.

### (a) *Predictive Ability*

Beaver, Kennelly and Voss (1968) examined the case for predictive ability as a criterion for the evaluation of accounting data and, whilst mindful of the shortcomings, concluded that the 'extension of research efforts into the predictive ability of accounting data is necessary for the fulfilment of accounting's decision making orientation and for the meaningful evaluation of alternative accounting measures' (p. 683). The importance of prediction has also been stressed by Carsberg, Arnold & Hope (1977) and by the FASB (1978, p. 3,032). The ability of alternative income measurement systems to provide forecasts of subsequent income has been used to evaluate alternative price adjusted accounting systems, e.g. Frank (1969), Simmons and Gray (1969), and Buckmaster *et al.* (1977). The prediction of measured earnings has also been used as the criterion in a simulation study by Demski (1969).

Although the three studies of price adjusted accounting systems used self prediction, it has become accepted that self prediction of the measured earnings figure is of little importance (Carsberg et al., 1977). However, there are some situations in which the accounting earnings figure has a direct effect on cash flows, e.g. taxation[1] and payment by results. In these situations forecasting accounting earnings will assist in forecasting the level and dispersion of future cash flows, and so the ability to predict accounting earnings is of economic interest. In addition to self prediction, the ability to predict economic income will also be considered.

### (b) *Economic Measurement*

Economic measurement will be narrowly interpreted as the ability to proxy economic income. Where earnings forecasts are incorporated into decision models as a surrogate for true economic earnings, the self forecasting ability becomes irrelevant, and it is the efficiency of the accounting series as an indicator of concurrent or future economic earnings that becomes the factor of interest. In the absence of perfect and complete markets no unequivocal definition of economic earnings exists because the appropriate discount rate to be used in net present value (NPV) calculations is problematic (Beaver & Demski, 1979). Valuation is no longer a well defined process, and the properties of any earnings numbers based on NPVs are unknown (Beaver, 1981). In the model developed below, it is assumed that the relevant discount rate is known, so that economic income can be calculated. This is then used as a standard of comparison for the alternative accounting procedures. This approach permits an exact analysis of the validity of various accounting earnings figures as surrogates for economic income, which is unambiguously defined in this model. In a situation with imperfect or incomplete capital markets it is not possible unambiguously to define economic income, and the analysis below becomes impossible.

If it is desired to permit incomplete or imperfect capital markets, a valuation model must be specified which incorporates an alternative to Hicksian income as the desired ideal, such as value to the business. While this is possible, the resulting model would be more complex, and the results would be conditional on the validity of the chosen valuation model. Since only a limited number of models can be explored, a choice must be made between a variety of alternatives, each of which is restrictive in some way, e.g. perfect and complete capital markets, the use of a particular valuation model etc. This choice depends on the extent to which the alternatives are thought to give helpful insights, and to be mathematically tractable.

Edwards et al. (1987) assume perfect and complete capital markets, and permit stochastic interest rates. However, the accounting income measures they consider are assumed to use the same correct risk adjusted discount rate used in the computation of the NPV, and so the stochastic interest 'cancels out'. The accounting income measures used in this paper are taken from current accounting practice and do not make use of the correct risk adjusted discount rate. In consequence, the discount rate does not cancel out and, if the interest rate is stochastic, this must be incorporated explicitly into the model. It is argued in the third section below that the appropriate discount rate is the risk free rate and, in order to make the problem mathematically tractable, it is assumed this risk free rate is constant over time.

There is no *a priori* reason to suppose that stochastic interest rates are a crucial feature in this analysis. Were stochastic interest rates to be built into the model, they would have no effect on the two alternative accounting procedures considered in detail below: SSAP 9 and realisation incomes. However, stochastic interest rates would induce greater variability into computed economic income, and this would reduce the strength of the estimated relationship between economic earnings and the two other earnings measures: SSAP 9 income and realisation income. The relationship between these would be unaffected by the introduction of stochastic rates.[2] Therefore, it was decided that the case of deterministic interest rates was worth exploring, while recognising that it remains a simplification, and that other approaches are possible.

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[1] In the UK corporation tax is determined by reference to taxable income not accounting profit. However, accounting profit conveys considerable information concerning tax payments. An analysis of the four most recently published accounts (generally 1985–1988) for the 73 non-financial firms from the FSTE 100 showed that the relationship between tax payments and pre-tax accounting profit was highly significant.

### (c) *Other Characteristics*

Other desirable qualities of accounting procedures may be amenable to the stochastic modelling approach. Reliability, objectivity and comparability are seen as pertinent to the regulators' assessment of accounting alternatives, and are capable of meaningful analysis (see Ijiri and Jaedicke, 1966; Parker, 1975; Revsine, 1985.) For example, Revsine modelled comparability and illustrated how, in a restricted setting, it may be possible to establish preference relationships regarding alternative inflation accounting procedures. The scenario used was necessarily abstracted from the 'real world', but is useful in formally identifying relevant parameters.

### (d) *Assessing Accounting Procedure*

This paper uses mathematical modelling to assess alternative accounting procedures. Model building is open to the difficulties inherent in selecting the desirable characteristics, and does not replace ex post positive testing, where applicable. However, the possibility of an ex ante examination of the implications of alternative accounting policies, the scope for alternative specifications of desirable characteristics to suit the needs of user groups other than shareholders, the control over the scenario which enables all other factors to be held constant, and the ability to review the effects of different industry characteristics and economic environments, makes stochastic model building a useful technique.

Once enacted, the potential exists for assessing the decision relevance of disclosed information. The most frequent example of such work is the assessment of inflation adjusted accounts as aids to shareholders' decision making by examining stock market reactions to inflation adjusted disclosure (see, for instance, Board & Walker, 1985 or Appleyard & Strong, 1984). However this process is only available as an *ex post* exercise, requires some independent measure of relevance such as the reaction in an efficient market, and is susceptible to imperfections in the research methodology which may struggle to identify subtle reactions.

Whether using theoretical models, simulation or ex post testing, two approaches to the evaluation of accounting procedures can be adopted. One technique appraises accounting procedures by their ability to signal the economically correct decision under specified circumstances. For example Edwards et al. (1987) argue that a form of current cost accounting will give correct indications of preferred action under various scenarios. An alternative approach, and that adopted by this paper, identifies variables which may have economic consequences, but leaves the evaluation of their importance to the political process. This procedure is also implicitly followed by Stark (1987), who studied the information required to allow the cash recovery rate, and hence the internal rate of return, to be calculated without specification of the precise decision to be addressed.

## SSAP 9 and profit on long-term contracts

SSAP 9, 'Stocks and Work in Progress', was issued by the ASC in May 1975 following ED 6 issued in May 1972. In November 1986, ED 40, 'Stocks and Long-term Contracts', which addresses some technical problems, was issued. It provoked little comment and no call for a reassessment of the underlying basic measurement principles contained within SSAP 9 and a revised SSAP 9 was duly issued in September 1988.

It would appear that SSAP 9 is now generally accepted. However, the standardisation and extension of the technique employed in certain industries to all long-term contracts (LTCs) was reviewed with some misgivings and resistance, as evidenced by the submissions to the ASC following the publication of ED 6. The requirements of SSAP 9 represent one of the more significant developments imposed by the standard setting process. One of the main changes occasioned by SSAP 9 was the requirement that profit should be attributed to LTCs as the work is performed, rather than being recognised only on completion, and it is this aspect of SSAP 9 that will be tested. LTCs were defined as being those individual contracts that were expected to take more than one year to complete. The justification for the early recognition of profits allowed by SSAP 9 lies in the expectation of a more indicative profit measure not distorted by the intermittent completion of contracts releasing profit and revenue in years different from those in which the work is done.

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[2] To test the significance of stochastic interest rates, a computer-based simulation model was constructed which allowed for either deterministic or stochastic interest rates. A comparison of the results of the two models showed that correlations involving economic income were, on average, 0.01 lower when using stochastic interest rates than otherwise, while stochastic interest rates increased the standard deviations of economic earnings by 10%. Although these results are dependent on the parameters specified for the model, they are felt to support the contention that stochastic interest rates are not a crucial component of this analysis.

Little evidence could be found in the submissions to the ASC or elsewhere of any explicit consideration of decision relevance, either in the form of predictability or of accounting as a surrogate measure of economic income. However, it is thought that some of the decision makers would have placed explicit weight on such information, if it had been available.

## The stochastic model

The cash flow generating process was modelled by specifying a reasonably simple model which, it is hoped, encapsulates the essential features of the problem. While most previous studies of accounting procedures have used deterministic models, that used here has introduced stochastic parameters as far as appears practical. Stochastic modelling permits an evaluation of the probability distributions of the model's endogenous variables which cannot be done using deterministic models. Such probabilistic aspects are thought to be an important feature of the problem, and their omission may seriously limit any subsequent conclusions. For example, it is not obvious which of several accounting income measures has a variance closest to that of economic income or the highest correlation with economic income.

The model contains two stochastic variables: the number of new contracts won by the firm each year ($N$) which is a positive integer, and the net cash flow from each of these contracts ($Y$). The value of $Y$ is determined when a contract is initiated, and is then certain to occur. Thus, the cash flows from a contract are 'fixed' at the time the contract is won, e.g. the contract price is specified in the contract while the inputs are brought forward at the contract date. Since the cash flows are certain, the appropriate discount rate ($r$), where $0 \leq r \leq 1$, is the risk free rate. It is assumed that during each contract's life costs are exactly offset by stage payments, so that the only net cash flow from each contract occurs at the end of its life. $N$ and $Y$ are assumed to be distributed independently both over time and from each other. The other parameter of the model is contract life ($n$), a positive integer, which is assumed to be deterministic. While it would be interesting to explore the consequences of stochastic contract lives, the resulting model becomes mathematically intractable. If stochastic contract lives are to be introduced a stochastic simulation approach is required, and this will be examined in a subsequent paper. The distributions of $N$ and $Y$ and the values of $n$ and $r$ are assumed to remain constant over time.

The total net cash flow of the firm for year $t$, ($X_t$), is the sum of the net cash flows from all contracts completed during that year. This means that $X_t$ is a random sum (Feller, 1971), and its mean and variance are given by:

$$E[X] = E[N]E[Y]$$

$$\sigma_X^2 = E[N]\sigma_Y^2 + (E[Y])^2 \sigma_N^2$$

where $\sigma_X^2$, $\sigma_Y^2$ and $\sigma_N^2$ are the variances of $X$, $Y$ and $N$ respectively. It is a feature of the model that $X_t$ follows a mean reverting process (MRP) (Beaver, 1970). The appendix contains a summary of the nature and properties of an MRP.

The empirical results on the nature of the stochastic process followed by accounting profits are mixed. Some studies have concluded that accounting profits follow a martingale process, while others have opted for a moving average process (Lookabill, 1976). When the variable of interest is the accounting rate of return, the case for a moving average becomes much stronger, and many empirical studies, Beaver (1970), Geronski and Jacquemin (1988), Mueller (1986), and Whittington (1971), have found that, in the long run, accounting rates of return tend to converge, thus ruling out a martingale process. Freeman *et al.* (1982) compared the competing hypotheses that accounting rates of return follow a martingale process or an MRP, and found the empirical evidence favours an MRP. In the model used in this paper it is assumed that all profits are distributed, and so the firm's capital employed is constant over time and the accounting rates of return are directly proportional to the accounting profits. Thus, the accounting profits considered in this study are expected to behave like rates of return.

A distinction may be drawn between the stochastic process generating the underlying event and that followed by the resulting accounting rates of return. Lookabill (1976) points out that the process generating the underlying events may be an MRP and the application of accounting systems, such as those used in the UK and the USA, will produce accounting rates of return which follow a moving average process. Thus, the assumption in this paper that the underlying events follow an MRP is consistent with the empirical evidence that accounting rates of return follow a moving average process (Beaver, 1970).

Earnings measures were computed using the two main alternative accounting systems, as well as economic income. The techniques used were:

(1) *Realisation*. All profits are taken only on completion of the contract, irrespective of the

length of the contract. Thus, a firm's realisation profit for year $t$ is given by $X_t$, which is an MRP.

(2) *SSAP 9.* This is as was specified by SSAP 9, where the profit on a contract was allocated pro rata over the life of the contract if the life was over one year, and profit was taken in the year of completion if the life was less than one year. The model assumes that the SSAP 9 income in year $t$ from a project with a life of $n$ years is $X_n/n$, and the firm's SSAP 9 income for the year ($Z_t$) is the sum of the SSAP 9 incomes for each of its contracts, i.e.

$$Z_t = [X_t + X_{t+1} + X_{t+2} + \cdots + X_{t+n-1}]/n$$

Thus, SSAP 9 income is the moving average (MA) of an MRP, and some of the properties of such a stochastic process are set out in the appendix. This model is a simplification of both the formal requirements of SSAP 9 and the practical difficulties involved. In particular, SSAP 9 requires any losses on a contract to be recognised immediately, but such an asymmetric treatment of losses would have made the mathematical analysis intractable. The simplification will be relaxed in a subsequent paper using a stochastic simulation model. Further, SSAP 9 requires that profits be taken only when they are reasonably certain. If the cash flows of existing contracts are uncertain, the recognition of profit will be deferred leading to results which fall somewhere between the pure application of SSAP 9 as modelled here, and the realisation approach.

(3) *Economic.* This is defined as ex post economic income where:

$$E_t = K_{t+1} - K_t + X_t$$

and $K_t$ represents the NPV of all future cash flows as at the start of year $t$, including expectations concerning contracts not yet won, while $E_t$ is the economic income for the year commencing at time $t$. Thus, economic income is realisation earnings plus the change in NPV of the future cash flows. The true parameters of the underlying data generating process are used in forming these expectations. The model is an MRP, and so the expectations of future cash flows at times $t$ and $t + 1$ are identical, and cancel out (see Appendix). Hence, only cash flows due from existing contracts need be included in the calculation of the $K_t$, and this greatly simplifies the calculation of economic income. The inclusion of growth would require the specification of a particular form of growth, e.g. linear, geometric etc, and this is as restrictive an assumption as stationary.

Expressions for economic income are more complex than for SSAP 9 or realisation due to the inclusion of discounting. In order to clarify matters the equations giving economic income for values of contract life from 1 to 4 will be presented.

When $n = 1$ $\quad E_t = X_t$

When $n = 2$ $\quad E_t = X_t(1 - y) + X_{t+1}y$

When $n = 3$ $\quad E_t = X_t(1 - y) + X_{t+1}y(1 - y) + X_{t+2}y^2$

When $n = 4$ $\quad E_t = X_t(1 - y) + X_{t+1}y(1 - y) + X_{t+2}y^2(1 - y) + X_{t+3}y^3$

where $y = 1/(1 + r)$. The general form of the above equations for $n > 1$ is:

$$E_t = (1 - y)[X_t + X_{t+1}y + X_{t+2}y^2 + \cdots + X_{t+n-2}y^{n-2}] + X_{t+n-1}y^{n-1}$$

It can be seen that when $n$ equals 1, economic incomes is an MRP. If $n > 1$ economic income will still be an MRP if the discount rate is zero, so that the above expression collapses to $E_t = X_{t+1-1}$. The appendix contains formulae for the computation of the variances and autocorrelations of the levels of the first differences for the three measures of earnings.

## Relationships between the income measures

The equations for the three alternative income measures can be used to derive some relationships between them.

(1) The relationship between their variances will be considered.

$$\sigma_Z^2 = \sigma_X^2/n$$

This shows that the extent to which the variance of SSAP 9 income is smaller than that of realisation income varies proportionately with contract life. The relationships between the variances of economic and realisation income, for various values of $n$ are:

When $n = 1$ $\quad \sigma_E^2 = \sigma_X^2$

When $n = 2$ $\quad \sigma_E^2 = \sigma_X^2[(1 - y)^2 + y^2]$

When $n = 3$ $\quad \sigma_E^2 = \sigma_X^2[(1 - y)^2 + y^2(1 - y)^2 + y^4]$

When $n = 4$ $\quad \sigma_E^2 = \sigma_X^2[(1 - y)^2 + y^2(1 - y)^2 + y^4(1 - y)^2 + y^6]$

The general formula for $n > 1$ is:

$$\sigma_E^2 = \sigma_X^2\phi$$

where

$$\phi = (1 - y)^2[1 + y^2 + y^4 + \cdots + y^{2(n-2)}] + y^{2(n-1)},$$

and $1/3 \leq \phi \leq 1$. This means that, for $n > 1$, the variance of economic income is less than or equal to the variance of realisation income, depending on the discount rate and the contract life. The variance of SSAP 9 income is related to the variance of economic income by:

$$\sigma_Z^2 = \sigma_E^2 / n\phi, \quad \text{where } n\phi \geq 1$$

(2) The correlations between contemporaneous values of the various income measures will be given. The correlation between the values of SSAP 9 and realisation income declines at a decreasing rate as contract life is increased:

$$p[Z_t, X_t] = 1/\sqrt{n}$$

and so the choice between SSAP 9 and realisation income becomes more important as contract life is increased. The correlations between realisation and economic income for various values of $n$ are:

$$\text{When } n = 1 \quad p[X_t, E_t] = 1$$

$$\text{When } n > 1 \quad p[X_t, E_t] = (1 - y)/\sqrt{\phi}$$

The correlations between SSAP 9 and economic income for various values of $n$ are:

$$\text{When } n = 1 \quad p[Z_t, E_t] = 1$$

$$\text{When } n > 1 \quad p[Z_t, E_t] = 1/\sqrt{(n\phi)}$$

This indicates that this correlation is reduced by an increase in contract life or the discount rate.

(3) The correlations between economic income and lagged values of SSAP 9 and realisation income will be analysed. (See also the Appendix.)

$$p[E_{t+j}, X_t] = 0, \quad \text{for all } j \geq 1$$

and so realisation is of no use in predicting economic income. The correlations between economic income and lagged values of SSAP 9 for various contract lives and lags, are given by:

$$\text{When } n = 1 \quad p[E_{t+j}, Z_t] = 0 \qquad \text{for } j > 0$$

$$\text{When } n > 1 \quad p[E_{t+j}, Z_t] = (1 - y^{n-j})p[Z_t, E_t] \quad \text{for } 0 \leq j \leq n$$

When $j > n$ this correlation is zero. Therefore the correlation for lagged values is less than for contemporaneous values, with the size of this reduction varying inversely with the discount rate.

(4) The behaviour of the first differences of the three income measures may be of interest, and these correlations are set out in the Appendix. Sufficient results are now available to conduct various comparisons between SSAP 9 and realisation.

## Implications of the model for choosing an accounting standard

In order to appraise the results, the general criteria of prediction and economic measurement must be made operational. The purpose of prediction is taken to be both self prediction and the prediction of economic income, while the interest in economic measurement will be interpreted as a desire to use accounting earnings as a proxy for economic income. Standard setters may be interested in the ability of an earnings measure to act as a predictor or as a proxy in the short run, the long run, or both, and as a measure of the level of income, the variability of income, or both. They may also be interested in changes in earnings as well as their level.

(a) *Long-run Means.* If the point of interest is the ability to predict or proxy the long-run mean value of income there is nothing to choose between the alternative measures. A clear feature of the model is that, when the underlying earnings process is in a steady state, the average earnings reported by SSAP 9, realisation and economic income are equivalent.

However, a decision maker may also be interested in the ability of a single earnings number to provide a reliable estimate of long-run mean income, and this can be judged by the magnitude of the variance of earnings. The earlier equations show that $\sigma_Z^2 \leq \sigma_E^2 \leq \sigma_X^2$, and so SSAP 9 has the smallest variance is preferable in this respect.

(b) *Dispersion of Economic Income.* Each earnings measure will have a dispersion about its long-run mean. Some decision makers who are interested in the risk attached to a firm's earnings may be concerned about the degree to which the past variation of an income series is a good proxy for the variability of economic income. This can be investigated by comparing the variances of SSAP 9 and realisation earnings with that of economic income. Since:

$$(\sigma_X^2 - \sigma_E^2) - (\sigma_E^2 - \sigma_Z^2)$$

$$= \sigma_X^2(1 - \phi) - \sigma_X^2(\phi - 1/n) = \sigma_X^2 d/n$$

where $d = (1 + n - 2\phi n)$, this term may be positive or negative, depending on contract life and the discount rate.

This table reveals that, if the interest rate is over about 10%, for contract lives of under about 3 years realisation is superior as a proxy of the variance of economic income, while for longer contracts SSAP 9 is likely to be preferable on this criterion.

(c) *Concurrent Economic Income.* Another way of appraising the alternative accounting techniques is in their ability to measure concurrent economic income. The correlation coefficient between SSAP 9 and economic income for $n > 1$ is $1/\sqrt{(n\phi]})$, while for realisation and economic income it is $(1 - y)/\sqrt{\phi}$. For contract lives below 5 years, SSAP 9 has the higher correlation with economic income. For longer contract lives, the income measure which has the higher correlation depends on the discount rate. The second column of table 1 shows that for realistic values of $r$ and $n$ the correlation

**Table 1**
**Critical Discount Rates**

| $n$ | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| | % | % | % | % |
| 1 | 100 | — | — | — |
| 2 | 17 | — | — | 50 |
| 3 | 11 | — | — | 41 |
| 4 | 9 | — | 75 | 35 |
| 5 | 7 | 81 | 62 | 31 |
| 6 | 6 | 69 | 53 | 27 |
| 7 | 5 | 61 | 47 | 25 |
| 8 | 4 | 55 | 42 | 23 |
| 9 | 4 | 50 | 38 | 21 |
| 10 | 3 | 46 | 35 | 19 |

Column 1 lists the minimum discount rates for which the variance of SSAP 9 is closer than realisation to that of economic income. Column 2 lists the maximum discount rates for which SSAP 9 has a higher correlation than realisation with economic income. Column 3 is as for column 2, but regarding first differences rather than levels. Column 4 lists the maximum discount rates for which one period lagged income differences have a higher correlation with economic income for SSAP 9 than for realisation.

with SSAP 9 exceeds that with realisation, and so SSAP 9 is preferable.

The correlations between concurrent first differences of economic income and those of SSAP 9 and realisation income are such that, for $n < 4$, changes in SSAP 9 have a higher absolute correlation with economic income. However, as contract life increases, for some discount rates realisation has the higher absolute correlation. The third column of table 1 shows that, for realistic discount rates and contract lives, SSAP 9 has the larger correlation with economic income, and so is superior.

(d) *Self Prediction.* The decision maker may also be interested in the ability to predict both the level of earnings and changes in earnings. These can be examined by looking at the autocorrelation functions for each type of earnings. Since realisation income is an MRP, all the autocorrelations of levels are zero, while for the first differences the first order autocorrelation is $-0.5$ and the remainder zero. As SSAP 9 is the MA of an MRP, the autocorrelations of levels follow the pattern in table 2, while for the first differences of SSAP 9, when the lag equals contract life, the first order corrrelation is $-0.5$. All the other lagged correlations are zero.

These result imply that, for values of $n > 1$, SSAP 9 is better at the self prediction of income levels than realisation, with the size of the advantage rising with $n$. Table 3 contains the maximum autocorrelation for levels of economic income, i.e. $r$ equals 100%. It is interesting to note that economic income is autocorrelated, and that this effect is due to the presence of discounting. For realistic discount rates the values will be much lower than those in Table 3, and so economic income is inferior to SSAP 9 in the self prediction of levels, but superior to realisation.

**Table 2**
**Autorcorrelations for SSAP 9 Income levels**

| | *Contract Life in Years* | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| $p(Z_t, Z_{t-1})$ | 0 | 0.5 | 0.67 | 0.75 |
| $p(Z_t, Z_{t-2})$ | 0 | 0 | 0.33 | 0.50 |
| $p(Z_t, Z_{t-3})$ | 0 | 0 | 0 | 0.25 |
| $p(Z_t, Z_{t-4})$ | 0 | 0 | 0 | 0 |

For first differences, when the lag is one year, realisation is superior to SSAP 9 at self prediction, i.e. realisation has a correlation of $-0.5$ whereas that for SSAP 9 is zero. However, for a lag equal to the contract life the position is exactly reversed, i.e. zero and $-0.5$. For other lags they both have a zero correlation. Therefore, provided the appropriate lag is used, there is nothing to choose between the two income measures so far as this criterion is concerned.

(e) *Prediction of Economic Income.* A key feature of an income measure is the extent to which this year's value can be used to forecast the level and change in next year's income. This can be examined by means of correlations. For levels of SSAP 9 this correlation is $(1-y)/\sqrt{(n\phi)}$, while for realisation it is zero. So, once again, SSAP 9 is preferred. For lags of two or more years, realisation has zero correlation with this year's economic income, while that with SSAP 9 is a small positive number or zero.

**Table 3**
**Maximum Autocorrelations for Economic Income Levels**

| | *Contract Life in Years* | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| $p(E_t, E_{t-1})$ | 0 | 0.5 | 0.5 | 0.5 |
| $p(E_t, E_{t-2})$ | 0 | 0 | 0.33 | 0.27 |
| $p(E_t, E_{t-3})$ | 0 | 0 | 0 | 0.18 |
| $p(E_t, E_{t-4})$ | 0 | 0 | 0 | 0 |

For lags of longer than one year, changes in SSAP 9 have a correlation with changes in economic income that is the same or bigger than that for changes in realisation income. For one year lags, when $n$ is one, lagged changes in both SSAP 9 and realisation have a correlation of $-0.5$ with current changes in economic income, while if $n > 1$ the relative size of these correlations depends on the discount rate. Column four of Table 1 indicates that for realistic contract lives and discount rates, SSAP 9 is preferable.

## Conclusions

It has been shown that particular attributes of accounting numbers can be readily modelled under different accounting policies and the explicit calculation of the effects of the alternatives may allow the participants in the standard setting process to conduct their activities on a more informed basis. In particular, the apparent dominance of costs in the assessment process prior to the introduction of a standard can be redressed by building models which attempt to evaluate some of the benefits.

In the SSAP 9 example presented here, it was found that, according to the criteria applied, SSAP 9 is generally superior to realisation. The analysis of levels of income revealed that, on four of the criteria, SSAP 9 is preferable to realisation. It is superior in proxying concurrent economic income, predicting future economic income, self prediction and in the use of a single earnings figure as an estimate of the level of long run income. Realisation's only superiority is an indicator of the variance of economic income when contract life is under about three years. For changes in income, SSAP 9 is as good or better than realisation on all three of the criteria used. This leads to the conclusion that, on the criteria applied above and given the assumed income generating process, SSAP 9 is superior. Of course, the possibility always remains that some other untested accounting technique exists which is preferable to SSAP 9, and so this approach can only establish rankings not global optimality.

While these conclusions are very largely independent of the numerical values taken by the variables in the model, the equations provided in this paper enable the decision maker to insert the appropriate values to calculate the numerical size of the superiority of SSAP 9 in a particular situation. The underlying stochastic model used in this paper is, of necessity, a simplification of reality. The aim was to specify a model that incorporated what are thought to be the fundamental features of the real world situation. Some aspects of the real world, such as stochastic contract lives and interest rates, inflation and growth, were excluded to keep the resulting model mathematically tractable and to ensure that the basic results were not obscured by more complex relationships. This permits the results obtained to act as a base case against which more intricately specific models can be assessed; and this will be done in a subsequent paper.

The ultimate decision on an accounting standard hinges on an analysis of the perceived costs and benefits. This paper has concentrated on a mathematical analysis of two types of benefit—prediction and economic measurement. Other criteria exist by which alternative income measurement techniques can be compared, and these may produce a different ranking. For example, the producers of accounts bear additional costs where SSAP 9 procedures are utilised. The ASC may also be concerned by the extent to which a standard will be acceptable to the preparers and users of accounts. Such factors are difficult to quantify, and mathematical models like that presented in this paper cannot replace the overall judgment of the members of the ASC. However they can provide helpful quantification of some aspects of standards which are not usually explicitly considered.

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## APPENDIX

### 1. Mean reverting process-realisation income

The variable $X_t$ follows an MRP if the following conditions are met:

$$X_t = \mu + e_t$$

$$E[e_t] = 0$$

$$\sigma^2(e_t, e_s) = 0 \quad \text{for all } t \text{ and } s, \text{ where } s \neq t$$

$$\sigma^2(e_t) = \sigma^2 \quad \text{for all } t$$

where $\mu$ is a constant, $e_t$ represents the disturbance terms (distribution unspecified) and $\sigma^2$ indicates a variance or covariance.

The above conditions can be used to derive some further properties of the $X_t$. These are that:

$$E[X_t] = \mu$$

$$E[X_{t+j} - X_t] = 0 \quad \text{for all } j \geq 0$$

$$\sigma^2(X_t) = \sigma^2 \quad \text{for all } t$$

$$\sigma^2(X_t, X_s) = 0 \quad \text{for all } t \text{ and } s \text{ where } s \neq t$$

$$\sigma^2(X_{t+j} - X_t) = 2\sigma^2 \quad \text{for all } j > 1$$

$$\sigma^2((X_{t+1} - X_t), (X_t - X_{t+1})) = -\sigma^2$$

$$p[(X_{t+1} - X_t), (X_t - X_{t-1})] = -\sigma^2/2\sigma^2 = -1/2$$

$$p[(X_{t+j+1} - X_{t+j}), (X_t - X_{t-1})] = 0 \quad \text{for all } j > 1$$

where $p$ denotes a correlation coefficient.

### 2. Moving average of a MRP—SSAP 9 income

Consider a situation where an MA over $n$ years has been applied to an MRP to produce a new variable: $Z_t$. Thus:

$$Z_t = \sum_{i=0}^{n-1} X_{t-i}/n$$

then it follows that:

$$E[Z_t] = \mu$$

$$E[Z_{t+j} - Z_t] = 0 \quad \text{for all } j \geq 0$$

$$\sigma^2(Z_t) = \sigma^2/n$$

$$\sigma^2(Z_{t+j} - Z_t) = 2\sigma^2 j/n^2 \quad \text{for all } j > 0$$

$$p[Z_{t+j}, Z_t] = (n - j)/n \quad \text{for all } j > 0$$

$$p[(Z_{t+j+1} - Z_{t+j}), (Z_t - Z_{t-1})] = 0 \quad \text{for all } j \neq n$$

$$p[(Z_{t+j+1} - Z_{t+j}), (Z_t - Z_{t-1})] = -1/2 \quad \text{for all } j = n$$

### 3. Economic income

Economic income is defined on p. 155 and an equation for the variance of economic income in terms of $\sigma^2$ is given on p. 156. The equations for first order autocorrelation of economic income for various values of $n$ are:

When $n = 1 \quad p[E_{t+1}, E_t] = 0$

When $n = 2 \quad p[E_{t+1}, E_t] = y(1-y)/\phi$

When $n = 3 \quad p[E_{t+1}, E_t] = y(1-y) \times (1 - y + y^2)/\phi$

When $n = 4 \quad p[E_{t+1}, E_t] = y(1-y) \times (1 - y + y^2 - y^3 + y^4)/\phi$

and the general formulae for all lags ($j$) and contract lives are:

When $n < (j+1) \quad p[E_{t+j}, E_t] = 0$

When $n = 2 \quad p[E_{t+1}, E_t] = y(1-y)/\phi$

When $n = 3 \quad p[E_{t+1}, E_t] = y(1-y) \times (1 - y + y^2)/\phi$

When $n = 4 \quad p[E_{t+1}, E_t] = y(1-y) \times (1 - y + y^2 - y^3 + y^4)/\phi$

and the general formulae for all lags ($j$) and contract lives are:

When $n < (j+1)$ $\quad p[E_{t+j}, E_t] = 0$

When $n = (j+1)$ $\quad p[E_{t+j}, E_t] = y^j(1-y)/\phi$

When $n > (j+1)$ $\quad p[E_{t+j}, E_t] = y^j(1-y)$
$\times(1 - y + y^2 - y^3 + y^4 \cdots y^{2(n-1-j)})/\phi$

The variance of the first differences in economic incomes is:

$$\sigma^2(E_{t+1} - E_t) = 2\sigma_X^2\phi(1 - p[E_{t+j}, E_t])$$

The autocorrelations of the first differences of economic income are complex, and are not considered in this paper.

## 4. Correlations of first differences

The correlations between concurrent changes in realisation and economic income for various contract lives are:

When $n = 1$ $\quad p[(E_{t+1} - E_t), (X_{t+1} - X_t)] = 1$

When $n = 2$ $\quad p[(E_{t+1} - E_t), (X_{t+1} - X_t)]$
$= (2 - 3y)/\phi$

When $n > 2$ $\quad p[(E_{t+1} - E_t), (X_{t+1} - X_t)]$
$= (2 - 3y + y^2)/\phi$

where $\phi = 2\sqrt{\{\phi(1 - p[E_{t+1}, E_t])\}}$, while the correlations for lagged changes in realisation are:

When $n = 1$ $\quad p[(E_{t+2} - E_{t+1}), (X_{t+1} - X_t)]$
$= -1/2$

When $n > 1$ $\quad p[E_{t+2} - E_{t+1}), (X_{t+1} - X_t)]$
$= -(1-y)/\phi$ $\quad p[(E_{t+j+1} - E_{t+j}),$
$X_{t+1} - X_t)] = 0$
for all $j > 1$ and for all $n$

The correlations between concurrent changes in economic income and SSAP 9 are:

$p[(E_{t+1} - E_t), (Z_{t+1} - Z_t)]$
$= (y^{n-1} + 1 - y)/\phi$ for all $n$

The correlations between lagged changes in SSAP 9 and changes in economic income for one year lag are:

When $n = 1$ $\quad p[(E_{t+2} - E_{t+1}), (Z_{t+1} - Z_t)]$
$= -1/2$

When $n > 1$ $\quad p[(E_{t+2} - E_{t+1}), (Z_{t+1} - Z_t)]$
$= y^{n-2}(1 - 2y)/\phi$

For longer lags the correlations are:

When $n = j$ $\quad p[(E_{t+j+1} - E_{t+j}), (Z_{t+1} - Z_t)]$
$= -(1-y)/\phi$

When $n > j > 1$ $\quad p[(E_{t+j+1} - E_{t+j}), (Z_{t+1} - Z_t)]$
$= y^{n-j-1}(1-y)^2/\phi$

When $j > n$ $\quad p[(E_{t+j+1} - E_{t+j}),$
$(Z_{t+1} - Z_t)] = 0.$

The correlations between concurrent changes in SSAP 9 and realisation income are:

When $n = 1$ $\quad p[(Z_{t+1} - Z_t), (X_{t+1} - X_t)] = 1$

When $n > 1$ $\quad p[(Z_{t+1} - Z_t), (X_{t-1} - X_t)] = 1/2.$

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# Cash Flow Accounting and Liquidity: Cash Flow Potential and Wealth

George J. Staubus*

**Abstract**—The persistence of a minority interest in 'cash flow accounting' alongside the dominant financial reporting pattern that gives cash flow statements a distinctly secondary role in the line-up of flow statements suggests that something is missing from the analyses of the interested parties. The major theme of this paper is that users rely on historical cash flow reporting for information relevant to projecting enterprise liquidity in the short run, and on financial statements based on accrual-deferral accounting for information relevant to their interest in wealth and income. An explicit distinction between the two accounting objectives (providing information for use in assessing future enterprise liquidity and providing information for use in assessing enterprise wealth and income and performance against investors' augmentation-of-wealth objective) is recommended as a basis for clarifying the issues. That distinction suggests the value of two quite different, but related, sets of data: historical cash flows and stocks and flows of cash potentials.

A number of accounting scholars have proposed that 'cash flow accounting' be emphasised more than has been common in conventional financial reporting. Lee (1972, 1981, 1984 and elsewhere) and Lawson (1971, 1978, 1985 and elsewhere) have been prominent among European advocates of cash flow accounting. The works of theorists advocating emphasis on forms of exit values (Chambers, 1966 and elsewhere; Sterling, 1979 and elsewhere) are related to the cash flow accounting proposals through their common concern with enterprise liquidity, or short-term capacity to pay. More recently, several researchers employing econometric techniques have tested securities market responses to flow variables other than conventional earnings; examples include Bowen, Burgstahler and Daley (1986, 1987); Rayburn (1986), and Wilson (1986, 1987). The cash flow issue refuses to go away.

Comparison of cash flow and exit value accounting ideas with more conventional accounting principles reveals deep-seated conflicts. It seems appropriate for one who has long argued for more emphasis on cash flows (Staubus, 1961 and elsewhere) to try once more to put the role of cash flows in financial reporting into perspective. In doing so, the contributions of Egginton (1984, 1985) and the value of his exchange with Lawson (1985) and Lee (1985) are acknowledged.

Most of these comments are intended as generally *descriptive* of pertinent financial and accounting practices observable in Western industrialised democracies, although the impracticality of precisely distinguishing between descriptive and normative statements is granted.

The conclusions, which are believed to be supported by the evidence presented, are (1) that *ex post* and *ex ante* cash flow reporting is valuable to those seeking to assess enterprise liquidity, (2) that liquidity and wealth should be distinguished more clearly, and (3) that the relationships between the key concepts and the role of cash flow potential have been neglected.

## Premises

The starting point is a brief review of those features of investment activities and financial reporting that provide the base for an evaluation of the potential roles of reports on historical cash flows and on cash flow potentials.

### *Investment*

The investment relationship is a reasonable place to commence an examination of the role of cash flow accounting in reporting to external parties. The essence of investment is the forgoing of present consumption of wealth for the purpose of enhancing future consumption (including bequests for consumption by beneficiaries). In a fundamental sense, all investors are individuals; business enterprises are only conduits. Investment success is defined as augmentation of the investor's stock of consumption purchasing power. That stock of consumption purchasing power may be under the direct control of the investor, or it may be managed by an agent—a manager of an investee enterprise.

In some cases, investments are divided into homogeneous units (shares, bonds) that are publicly traded, thus providing direct market price evidence of the investor's stock of consumption purchasing power—the value of the investment. In those cases, many investors seek additional evidence for assessing the value of their investments as a step towards investment decisions. In other cases, no market price for the investment is observable, so again investors seek evidence for assessing values of investments. In either case, the essence of investment value is potential consumption purchasing power, and conversion of that investment value embodied in a business enterprise to direct purchasing power in the hands of the investor depends on the enterprise's future capacity to pay. That dependency presumably explains investors' efforts to predict enterprise cash flows.

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*George J. Staubus is a professor at the Graduate School of Business Administration, University of California at Berkeley.

An investment analyst's predictions of cash flows may take various forms. First, the direct approach focusing on cash receipts and cash disbursements might be taken. Second, the dividend stream approach is used by many analysts (Hawkins and Campbell, 1978, p. 17). It is based on the idea that the shareholder's direct cash receipts (prior to sale of the shares) is in the form of dividends. Because dividends depend on enterprise cash flows, any well-supported projection of dividends must rest on a projection of the firm's capacity to pay—in cash, with rare exceptions. Third, the analyst may concentrate on predicting earnings (interpreted as cash flows normalised through the accrual-deferral process) and either assume that all revenues and expenses are realised in cash flows in the reporting period plus or minus an immaterial lead or lag, or adjust the predicted earnings for material discrepancies between earnings and cash flows. Any component of earnings that is not related to a recent past, current, or near future cash flow presumably is suspect. For example, if an accountant makes an upward revaluation of goodwill, the analyst is not likely to accept the offsetting entry as a component of earnings. (See Hawkins and Campbell, pp. 97–121, for other examples.) A common interpretation of certain earnings-cash flow discrepancies is as influences on the 'quality of earnings'. For example, if inflation is perceived as requiring expenditures for replacement in excess of reported cost of goods sold and depreciation, the quality of earnings is downgraded. In sum, whether the analyst thinks primarily in terms of earnings, dividends, or direct cash flows, the underlying phenomena of interest are enterprise cash flows. Prospective earnings that are not realisable in cash flows are not important to the investor. Discounting is appropriate in every case.

Many investors, of course, do not make the type of intensive analyses suggested here. They may rely on tips or qualitative judgments, or accept reported earnings without question for use in relative price-earnings assessments. But to the extent that the specific contents of financial statements are used by professional analysts in projecting the firm's capacity to meet investors' objectives, one or more versions of enterprise cash flows are the underlying phenomena of interest (Hawkins and Campbell, 1978; Hawkins *et al.*, 1983). See Exhibit I for a summary of the relationship of earnings to share value that has underlain my own work in this area since 1961.

### *Financial Reporting*

The decision-usefulness objective of financial reporting (Staubus, 1954, 1980) is taken for granted here, although its acceptance probably is not descriptive of practice. Perhaps those most interested in considering the uses of data on historical cash flows and on cash flow potentials are willing to accept that objective. The types of decisions that appear to be most prominent are the basic investment-disinvestment decisions, other contracting decisions, and control-oriented decisions—areas that clearly overlap and that focus on enterprise wealth and liquidity.[1] The investor's interpretation of enterprise wealth—a stock of potential consumption purchasing power—is accepted by those parties engaged in contracting and control decisions. In a money economy, enterprise wealth is interpreted as cash flow potential (Staubus, 1967, p. 660; 1977, p. 163; FASB, 1978, para. 41). The concept of cash flow potential is meant to embody the amount, timing, risk, and cost-of-capital features that determine the market value of a prospective cash flow stream. That interpretation of wealth is generally accepted, often without explicit articulation, in the world of finance (Brealey and Myers, 1984, p. 21; Copeland and Weston, 1979, p. 16). Assets are thought of as positive cash flow potentials; liabilities as negative cash flow potentials. Investors seek information regarding stocks and flows of the entity's cash flow potentials.

Investors and others making investment, contracting, and control-oriented decisions often are said to be concerned with the entity's 'performance' (Egginton, 1984). The meaning of performance is critical. Whether one visualises a corporate version of the medieval master-steward relationship, the principal/agent model, or the conventional owner/manager relationship, performance in the context of reporting to investors means achievement of investors' objectives—enhancement of future consumption—through augmentation of enterprise cash flow potential. Maintenance of liquidity is a means to that end. The cash flow potential interpretation of wealth is

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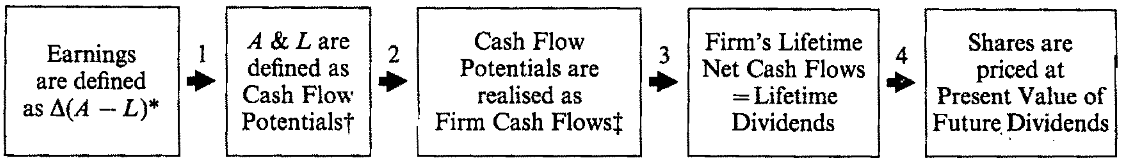
[1] For a different but related view of the 'uses of information', see Butterworth, Gibbons and King (1982, pp. 9–17).

**Exhibit I**
**Relationship Between Accounting Numbers and Share Prices**


Earnings are defined as $\Delta(A - L)$*
1
$A$ & $L$ are defined as Cash Flow Potentials†
2
Cash Flow Potentials are realised as Firm Cash Flows‡
3
Firm's Lifetime Net Cash Flows = Lifetime Dividends
4
Shares are priced at Present Value of Future Dividends

Link 1 is the Double Entry Tie of Income to Net Assets.
Link 2 is Realisation of Cash Flow Potentials, Subject to Measurement Errors and Omissions.
Link 3 is the Equality of a Firm's Lifetime Net Cash Inflows and Outflows.
Link 4 is the Present Value Model of Share Value.

*Earnings are defined as change in net assets other than in transactions with owners.

†Cash flow potential incorporates the amount, timing, risk, and cost-of-capital features that determine the market value of a prospective cash flow stream.

‡Accounting relies on imperfect evidence of cash flow potential for its measurements: cash at face value, estimated future cash flow, discounted estimated future cash flows, exit prices, current entry prices linked to exit prices in equilibrium, and old entry prices linked to current entry prices by the random walk pattern. Certain assets and liabilities are omitted due to unacceptable measurement weaknesses.

accepted in the world of financial management.[2] *Corporate performance is measured by change in cash flow potential.*

Investors recognise the necessity for trading off risk and return. Information relevant to assessing risks—especially risk of loss of liquidity—is sought by investors. Therefore, information helpful in understanding and predicting the entity's liquidity is valued by investors and investor-oriented users of financial reports. The risk of illiquidity and other risks involve uncertainties of many kinds, so it is difficult to specify standard measures of such risks or proper reporting of risk-relevant information. However, historical cash flow information is widely recognised as helpful in that regard.

## Reasons for interest in cash flow accounting

Much attention has been given to the case for historical cash flow accounting in the last 15 years, so it is not necessary to go into great detail in this section. The works of G. H. Lawson and T. A. Lee have been especially prominent, and they extend well beyond the publications listed in the references at the end of this paper. Lee (1981) has argued for a combination of historical cash flow accounting and net realisable values assuming no continuity of enterprise activities (p. 164)—an information set that would appear to provide an excellent basis for 'liquidity management assessment' (p. 170). Staubus (1966, 1977) also deals with arguments pertaining to alternative asset flow concepts, especially flows of cash, net short-term monetary assets, net working capital, and net assets. The discussion in this section, however, is limited to historical cash flow accounting.

Departing from the descriptive mode for the present, the following observations might lead one toward historical cash flow accounting:

1. The entity's stock of cash at the reporting date is of interest because it represents the ultimate liquid asset. Interest in a stock might lead one to the related flows—how the stock arose.
2. Cash serves as the beginning and ending anchor points of sets of related activities viewed as cycles.
3. The role of historical cash flow information as a base on which to build cash flow projections is widely acknowledged. Cash flow projections are used by those who:
   (a) Are concerned about the firm's liquidity, financial flexibility and short-run survival;
   (b) Think of the firm's capacity to pay at any future time as dependent on its cash flows to that time.

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[2] In that portion of the world of finance that is oriented to securities markets, descriptive models of securities values clearly focus on the discounting of future cash flows, as they have for several centuries. (See, for example, Isaac Newton (1686) and Eugen von Böhm-Bawerk (1891). The importance of future cash flows to portfolio managers may have increased in recent years as more of those managers have been driven by the responsibility to provide the cash flows necessary to meet pension obligations. In the world of corporate financial management, the net present value model of investment project analysis emphasises management's overriding concern with finding projects that have net positive cash flow potential. Is there any significant evidence to challenge the acceptance of the cash flow potential interpretation of wealth and management performance in the business world?

4. Unreliability and lack of relevance of many measurements of net asset items—e.g., allocations of historical costs—and omission of many valuable resources and obligations from balance sheets, are recognised as weaknesses in the accrual/deferral measurements of wealth and income that make information on alternative stock/flow concepts helpful in assessing the entity's future capacity to pay. The superior reliability (observability, verifiability, representational faithfulness, neutrality) of historical cash flow data surely is a great—perhaps its greatest—strength.

The above considerations, no doubt augmented by others, justify the periodic reporting of a substantial amount of cash-oriented financial information. External reporting practices, for example those required by the Financial Accounting Standards Board's Statement No. 95 (1987), have responded to the indicated need.

## The role of cash flow in financial reporting in the 1980s

Returning to the descriptive mode, this section includes observations regarding the roles for which historical cash flow information is widely accepted and a role for which it is not generally accepted, and why.

### *Acceptance of Historical Cash Flow Data: For Reporting on Liquidity*

One can say with some assurance that cash flow reports, or flow reports on some other pool of relatively liquid assets, are widely accepted as helpful to those concerned with an enterprise's past and future liquidity. Information on historical flows is treated as a starting point for projecting cash flows, including dividends, interest payments, and principal payments to creditors. This includes judging the prospect for occurrence of a liquidity crisis. In addition, the information typically provided in cash flow statements regarding investing and financing transactions, operating cash flows, and changes in current asset and current liability items help the reader to understand the firm's activities and management's policies. If the conventional wisdom—that the two major operating objectives of business managers are to maintain liquidity and profitability—is true, cash flow reporting clearly provides information relevant to evaluations and projections of management's performance as measured by the liquidity objective, as noted by Lee (1985, pp. 93, 95).

A curious feature of the widely accepted notion that reporting flows of cash or a similar pool of liquid funds is worthwhile is that those advocating or requiring such reporting give little attention to the concept of liquidity. See, for example, FASB, 1987. An exception is Lee (1981, 1985) who does give considerable attention to the role of cash flow accounting in reporting on liquidity. Liquidity does not, however, tend to be viewed as something that exists, like wealth. Rather, it is seen as an intangible quality of a firm's financial position. The tangible version of liquidity is net liquid assets, which may be defined in relatively narrow or broader terms. Thus, the FASB, which does not define liquidity or liquid assets, calls for cash flow reporting for a pool consisting of 'cash and cash equivalents,' the latter consisting of 'short-term, highly liquid investments that are both: (a) readily convertible to known amounts of cash, and (b) so near their maturity that they present insignificant risk of changes in value because of changes in interest rates. Generally, only investments with original maturities of three months or less qualify under that definition' (1987, para. 7). An earlier view was:

> We believe the essence of the liquidity concept is *short-term capacity to pay*... The primary attribute of a liquid asset is *quickness of convertibility to cash*... A secondary attribute, which we believe most businessmen expect of a liquid asset, is lack of adverse consequences to the entity from the conversion of the asset to cash. The most likely adverse consequences are (a) impairment of operating capacity and (b) the sacrifice of existing wealth, that is, a loss (Staubus, 1977, pp. 366–7).

If cash flow accounting, or any other financial reporting approach, is to be developed further in the interest of reporting on, and contributing to an understanding of liquidity, a more serious investigation of the liquidity concept seems appropriate. Lippman and McCall (1986, p. 48) suggested that 'an asset is liquid if it *can be sold quickly* at a *predictable price*.' But their approach included a 'sales policy that maximizes the expected discounted value of the net proceeds associated with the sale, and defining the asset's liquidity to be the expected time until the asset is sold when following the optimal policy' (p. 44). This position is consistent with Keynes: one asset is more liquid than another if it is 'more certainly realisable at short notice without loss' (1930, p. 67). Liquidity, in this view, is not associated with forced sales.

Three factors appear to determine an asset's liquidity: (1) standardisation of the asset, (2) thickness of the market, and (3) operational efficiency of the market. With regard to standardisation, monetary assets are more objectively classifiable than nonmonetary assets. Accountants have identified three important characteristics of future cash flows: time, amount, and uncertainty. With certainty, the liquidity of money claims is clear. Uncertainty adds a subjective factor, but financial markets are accustomed to dealing with it. The liquidity of many, but not all, money claims is readily assessed.

Turning to nonmonetary assets, those that are graded by well-established standards, as are many agricultural and mineral products, can also 'be sold quickly at a predictable price,' although the degree of predictability varies, especially with the prediction period. Other nonmonetary assets must be recognised as nonstandard and not subject to ready classification. The extreme cases are genuinely unique assets such as real property, specialized assets in process of construction to customers' specifications, and intangibles. It is possible, of course, that a nonmonetary asset could be more liquid than certain monetary assets.

Thin markets are an enemy of liquidity. 'When there are many transactions per day of a homogeneous assets such as wheat or long-term Treasury bonds, the market for the asset is thick' (Lippman and McCall, p. 47). To a prospective seller, the number of buyers in an asset market is most relevant to the asset's liquidity. 'Accordingly, the thickness of the market for an asset is said to increase with the frequency of offers' to buy (Lippman and McCall, p. 47).

Finally, the operational efficiency of the market for an asset affects its liquidity. 'If capital markets are efficient, then purchase or sale of any security at the prevailing market price is a zero-NPV (net present value) transaction' (Brealey and Myers, p. 265). That definition could be extended to other asset markets. Examples of transaction costs that are widely recognised as reducing liquidity are: brokerage commissions, transfer taxes, income taxes triggered by realisation of gains from sale, sales and value-added taxes, and search costs such as advertising, other communication costs, and agents' time. Tax advantages enjoyed when losses are realised are negative transaction costs.

'In view of this discussion, it is clear that financial assets traded in a thick, efficient market will be exceedingly liquid' (Lippman and McCall, p. 50). But that is not enough to define liquidity. With more attention to liquidity, perhaps accountants could develop the concept more fully. For now, the above-quoted 1977 definition may be acceptable.

Note that two related concepts of liquidity are relevant: the liquidity of an individual asset and the liquidity of an enterprise. The latter might involve a time dimension cut-off for both assets and liabilities. Net liquid assets might, for example, include both assets readily convertible to cash in the normal course of business within a week and liabilities due for payment within a week. (In the United States, transactions on major securities markets must be settled in cash within five business days). Dichotomous classification of assets (as either liquid or illiquid) would seem to be a crude application of the liquidity concept to individual assets, but any operational concept for comparing the liquidity of enterprises probably requires a uniform dividing line between liquid items and others, thus defining a pool of 'liquidity'. In practice, that pool of liquidity does not include such nonmonetary cash flow potentials as stocks of merchandise and materials, or real property, at net realisable values. They typically cannot be sold quickly without adverse consequences. It is not unreasonable to propose a concept of liquidity that includes such items, but that does not seem to be a popular view currently. Liquidity of an asset is a matter of degree; empirical evidence of an asset's convertibility to cash quickly and without loss would seem to be the only basis for arguing with current practice.

### *Rejection of Historical Cash Flow Data: For Reporting on Wealth*

Now consider a role for which historical cash flow accounting is not generally accepted as suitable: reporting on wealth and income—and management's performance on the profitability criterion. A review of the status quo may not be satisfying to those committed to change, but the general reasons for preferring accrual-deferral accounting for measuring wealth and income should be acknowledged by all who are interested in the present issue. First, the opportunities for 'operating manipulation' of a cash flow measure of income are substantial. Operating manipulation consists of controlling or influencing the timing of cash transactions so as to affect the operating results of the period. Such opportunities are, of course, permitted by the rules of conventional accrual-deferral accounting, e.g., in the areas of maintenance costs, research and development, training, and other expenditures that are treated as immediate expenses even though they are investments for the benefit of future periods. But the opportunities to control cash transactions with suppliers and customers are generally recognised to be much greater. Those impressed with management's ability to manipulate conventional income by both operating tactics, as mentioned above, and by accounting choices must be even more impressed with the manipulation potential under cash flow accounting.[3] For example, imagine the potential for manipulation by a manager whose bonus is based on the change in cash balance, or on operating cash flow, in a reporting period.

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[3] An observation based on experience with respondents to FASB proposals is that when the Board suggested requiring more up-to-date measurements of the values of wealth items, enterprise managers saw more merit in cash flow accounting. Whether that view reflected a preference for the manipulability of cash flows over 'putting themselves at the mercy of the markets' was never stated.

Related to the manipulation weakness of cash flow income are the potential 'economic consequences' of recognising cash transactions as revenues and expenses. In general, the problem is that whenever events are accounted for as having wealth effects that differ from those effects that are important to the 'principals,' agents can be expected to behave so as to maximise what is emphasised in the reports instead of what is sought by the principals. That is the weakness of present conventional accounting for 'intangible investments,' such as research and development, which are, from the point of view of owners, investments but which are treated as expenses by accountants. As between any two 'bases of accounting', the one that is further from that elusive 'economic accounting' that guides principals can be expected to have the less desirable economic consequences in the form of agents' opportunistic behaviour (Williamson, 1985, p. 47). Thus, expensing cash purchases of merchandise or plant assets (or expensing the excess of full acquisition cost over 'as-is' net realisable value) can be expected to discourage otherwise desirable purchases near the end of an accounting period. Conflicts between the measure of operating results that is emphasised in financial reporting and the measure that is of interest to principals is a weakness in any measurement system.

The preceding discussion of economic consequences leads to the third reason for preferring accrual-deferral accounting for the measurement of wealth and income: those noncash items that are recorded by conventional accrual-deferral accounting are important to principals. An owner of a merchandising business views a claim on a customer as valuable. The consumption of services purchased but not yet paid for is an economic sacrifice. The cash purchase of goods for future sale usually is not an unfavorable event. The case for such accruals and deferrals is an overwhelming one from the point of view of the owner of an enterprise who is concerned with measuring his/her own wealth and income, whether an agent is involved or not. That should not be forgotten in the context of discussions of the role of cash flow accounting.

Similarly, the purchase of long-term plant assets is not viewed by principals as sacrificing wealth. Those assets have cash flow potential. The difficulties in measuring such assets after their acquisition are acknowledged, but they are accepted as preferable to reporting acquisitions as declines in wealth—in the full amount of the acquisition cost in the case of strict cash basis accounting, or partially as in the case of a net realisable value system. Nevertheless, treatment of tangible plant assets and certain recognised intangibles contrasts with the conventional treatment of unrecognised intangible investments such as those involving training, systems development, and research and development. In the latter cases, the measurement difficulties have caused accounting to choose immediate expensing. In general, the choices represented in conventional accrual-deferral accounting result in both inclusion of certain items that are measured very crudely and exclusion from enterprise wealth of certain investments measurement of which is judged to be of negative net value. That is conventional accounting's solution to the general problem of measuring wealth and income. If a critic advocates change on the basis of measurement difficulties, should not incremental changes be tried first, rather than giving up on the measurement of wealth and income altogether?

## Cash flow potential: a measure of wealth

The objects listed as assets and liabilities on conventional balance sheets have a common property: cash flow potential. Unfortunately, cash flow potential is measured poorly, partly because accounting has not set its measurement as an explicit objective. But that objective is implicit in conventional accounting measurement practices, and all widely used measurement methods, at least in the United States, deal with cash flow potential. That is most obvious in the cases of those contractual receivables and payables that are measured on the basis of future cash flows, present value of future cash flows, or current market prices. Those measurements based on the form of net realisable value that considers the asset's most likely future course—sometimes called completed-cycle NRV—clearly are focused on cash flow potential. In other circumstances, in which the continuity assumption is not justified, 'as-is NRV,' based on sale of the work-in-process, finished goods, accounts receivable, or other assets without proceeding through remaining stages of the operating cycle in the normal course of business, would be consistent with a focus on cash flow potential. 'As-is NRV' under circumstances that justify the continuity assumption clearly is a liquidity-oriented measure (see final section).

Many have not thought of entry prices of assets as being related to cash flow potential, perhaps because completed-cycle NRV is more directly related to it. Nevertheless, it should be clear that in general equilibrium in a competitive economy, the relationships between entry and exit prices make the former relevant surrogates for the latter, and often superior on the reliability and cost criteria (Staubus, 1967, p. 655–6). Lack of equilibrium and market incompleteness certainly can result in gaps between fully loaded (with fringe acquisition costs) current entry prices and completed-cycle exit prices net of remaining costs (including cost of capital), but the validity of current entry prices as a market assessment of cash flow potential surely cannot be denied. Similarly, old entry prices (historical costs) were market assessments of that same property. In sum, conventional accounting practices do measure cash flow potentials, despite not having been purposefully designed to find and use the most relevant, reliable, and economical evidence.

Empirical research employing share prices as a criterion has tested the impact of the manifest 'defects' in conventional accrual-deferral accounting. The general conclusion based on more than a quarter of a century of such research (from Staubus (1967) to Bowen (1986, 1987), Rayburn (1986), and Wilson (1986, 1987)) is that the further the measure tested is from conventional earnings and the closer it is to strict cash flow, the poorer the results, although the value of conventional measurements of depreciation and depletion are still in doubt. Uncertainty regarding the value of depreciation measurements surely does not surprise proponents of serious, value-oriented measurements of plant assets, such as Baxter (1971). It is one thing to question conventional depreciation accounting; it is quite another to extrapolate such concerns to the entire accrual-deferral model.

## Conclusions

Three general conclusions follow from the above analysis. First, cash flow information is valuable to users who are concerned with an enterprise's liquidity. That need should not be neglected.

A second conclusion is that liquidity and wealth should be distinguished more clearly. Conventional accounting, and some of the literature, shows confusion on this point. Reporting on liquidity and reporting on wealth/income should be set out as separate objectives of financial reporting.

A third conclusion is that the close relationship between (1) historical cash flows, (2) cash flow projections, (3) cash flow potential, and (4) wealth and income make it easy to confuse liquidity-oriented aspects of past and future cash flows and wealth/income aspects. In particular, more attention should be paid to cash flow potential.

## Further comments: liquidity and cash flow potential

An example of failure to make a clear distinction between liquidity and wealth is apparent in certain research focused on a decision situation in which a person needs to know the economic unit's (individual's or firm's) liquidity. For example, an accounting theorist might ask a rhetorical question regarding information needed when one is deciding to sell or hold an asset. The answer clearly includes the asset's selling price. If the asset is shares, the shareholder needs a share market quotation, but that says nothing regarding information the corporation might provide to help the shareholder assess the hold option. Another example: asking a sample of independent professional persons questions regarding 'one's assets' or what makes 'one better off' might induce images of personal and family finances (Chambers, Hopwood and McKeown, 1984). Individuals frequently need to know their liquidity. Can the bills be paid? Can I buy that new automobile or property? They rarely need to know their own net worth in order to make decisions. Their curiosity about their net worth might lead them to think about—to speculate about—such important but not always objectively measurable assets as their retirement plan, their art objects, their potential inheritance, and their personal earning power, but they rarely need to quantify and sum those and other assets for direct decision making. Therefore, if you ask them what information about their assets they use, liquidation values are likely to come to mind. In such circumstances, reports based on historical cash flows and net realisable values, as suggested by Lee (1981), might be quite satisfying. Individuals not immersed in the daily problems of business management are not likely to identify liquidity and profitability as two separate requirements for an ongoing successful business, so may not distinguish between information on liquidity and information on wealth and income.

Individuals do not buy and sell fractional interests in economic units consisting of themselves or their families, so the aggregate values of such economic units need not be known for decision purposes. *Individuals do buy and sell fractional interests in other economic units—business entities—so they do seek information relevant to assessments of the values of such entities.* The liquidity of those entities is not the primary concern of buyers and sellers of ownership interests under typical circumstances. Liquidity and value need to be more explicitly recognised and distinguished.

An observation at the core of these remarks is that cash flow potential is the implicitly accepted concept of enterprise wealth in an exchange economy. Assets have positive cash flow potential; liabilities have negative cash flow potential. Net enterprise wealth is the algebraic sum of positive and negative cash flow potentials, with no time horizon as a limit. Accounting measurements are based on evidence of cash flow potentials—evidence which varies widely in its quality. The omission of many intangible investments is an example of treating as off-balance-sheet assets those items for which the evidence of cash flow potential is unacceptable on the reliability criterion. At the other end of the spectrum, cash balances, then short-turn receivables and payables and publicly traded securities, then current nonmonetary assets, then the various categories of noncurrent, nonmonetary, physical and nonphysical assets—all of these are recognised as having cash flow potential, and are measured by reference to evidence of cash flow potential, primarily market prices. Cash flow potential is, of course, measured very poorly.

Those who have studied economics are acquainted with the perfect competition model, an abstract construct that has been found useful in thinking about the formation of prices in markets. In the theory of finance, another abstract model is widely used: complete markets. In a complete market economy, a price can be observed for anything and everything. Prices for various prospective contributions to enterprise cash flow streams (cash flow potentials), such as the contributions of various assets to the enterprise's cash flows, may be observed. Those prices provide excellent guidance for investors and other economic actors. In equilibrium, all prices in the economy are linked at levels such that no remaining opportunities for arbitrage profits exist.

In the real world, prices for the prospective cash flow streams from particular assets and liabilities, as those are understood in accounting, are not observable and market prices are not in equilibrium. Accountants and managers are not able to find quoted market prices for the 'setting-specific' assets and liabilities of the firm, even though prices for similar assets in other environments may be observed. Consequently, accountants must report imperfect substitutes for the market values of all assets except cash. The conventional accounting measurement system has been called 'market simulation accounting', defined as 'the selection and blending of pertinent observed market prices and other evidence in accordance with accepted principles of market economics to assess the price at which an asset or liability would trade in an active market' (Staubus, 1986, p. 118). Those simulated market prices are for positive or negative cash flow potentials—the generally accepted interpretation of wealth.

Reporting on liquidity—a secondary concern of investors—should not be confused with reporting on wealth. An historical report on cash flows is a useful part of the former. Reporting cash flow potentials and changes therein is the essence of the latter. Explicit recognition and responses to those two separate interests of users might be a big step towards decision-useful financial reporting.

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# Beta Geared and Ungeared: The Case of Active Debt Management

**Tony R. Appleyard and Norman C. Strong***

**Abstract**—This paper extends the results of Buckley (1981) and Schnabel (1983) on the relationship between geared and ungeared betas. We contrast a passive debt management policy with an active debt management policy and derive the relevant beta degearing formulae for the case of an MM perfect capital market with corporation tax. We also extend these results to a world with personal taxes and debt related costs.

## Introduction

In previous papers in this journal, Buckley (1981) and Schnabel (1983) have developed formulae for degearing the beta of a geared firm's equity. Buckley's analysis assumed the existence of corporate taxes alone, while Schnabel extended Buckley's analysis to take account of personal taxes on debt and equity income. The results of both of these papers are consistent with what might be called a passive debt management policy.

Recent contributions to the academic literature in finance by Miles and Ezzell (1980, 1983) and Lewellen and Emery (1986) have contrasted a passive with an active debt management policy on the part of the firm. In this paper we explain the distinction between these two debt management policies and we examine the implications of an active debt management policy for degearing equity betas.

## Debt management policy

The implicit assumption regarding the firm's debt management policy that is standard in the journal and textbook literature on finance originates in the classic series of articles by Modigliani and Miller (1958, 1963, 1969). Modigliani and Miller (MM) assumed that in the presence of corporate tax the appropriate capitalisation rate for the interest tax shields earned on the firm's debt is the rate at which the market capitalises the income stream generated by the debt. It is well known that this leads to the following valuation relationship between the levered and unlevered firms:

$$V_L = V_U + T_C D \qquad (1)$$

where

$V_L$ = the market value of the levered firm
$V_U$ = the market value of the unlevered firm
$T_C$ = the corporation tax rate
$D$ = the market value of debt in the levered firm's capital structure.

What is often not spelt out in the literature, but a point which has been made by Miles and Ezzell (1980, 1983) and by Lewellen and Emery (1986), is that the MM valuation equation assumes a passive debt management policy (PDMP) on the part of the firm. MM (1963, p. 435, fn. 5) originally assumed that the firm's debt generates a perpetual, level and sure stream of interest tax shields. In turn they suggested that this rests on the twin assumptions that the firm must always be able to obtain the tax benefit of its interest deductions and that the tax rate will remain constant. It was on the basis of these assumptions that MM chose the debt interest rate as the appropriate capitalisation rate for the interest tax shields. This procedure has subsequently been widely followed in the finance literature with the consequence that equation (1) is now a standard result. However this treatment of the debt interest tax shield, which leads to equation (1), requires a further restriction on the firm's debt schedule. In their 1963 article, in footnote 9, MM do refer to this further restriction in noting that their valuation equation gives an exact measure of the advantage to debt financing only when it is assumed that the level of debt is fixed forever. However they do not develop the full implications of any alternative assumptions nor do they discuss the relative plausibility of alternative debt management policies. The additional assumption that is required regarding debt management policy can be understood more clearly by spelling out the rationale for the MM procedure.

The debt interest tax shields accrue to the equity shareholders in an MM world.[1] Therefore they should be capitalised at a rate which reflects the return which the shareholders require on the tax shields. In an MM world it is assumed either that there are no personal taxes or that personal tax rates on debt and equity income are equal. This means that the before personal tax returns on cash streams of equal risk are the same for both equity shareholders and debtholders. As a result, if the rate of return on debt is to be the appropriate equity capitalisation rate for the debt interest tax shields then, in addition to the assumptions on the tax rate and on the tax paying ability of the firm, it must also be assumed that the debt schedule is fully specified in advance by the management of the firm and that investors realise that this is the case. This guarantees that the debt interest tax shields do not depend upon the actions of the firm (see for example Ruback, 1986) and therefore that their risk is determined by the return that debtholders require on their debt. A consistent interpretation of this debt policy is that the debt schedule is fixed at the outset in terms of a target proportion of the firm's expected value at each point in time and with expectations formed at time zero. Moreover, regardless of whether subsequent cash flows turn out to be different from original expectations, or expectations as to future cash flows are revised through time, the debt schedule is left unaltered at the original planned levels; debt management is passive with respect to actual events. This makes it legitimate to capitalise all future debt interest tax shields at the required debt return.

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*The authors are, respectively, senior lecturer and lecturer in the Department of Accounting and Management, University of Newcastle-upon-Tyne.

[1] That is, the debtholders accept the market rate in lending to the firm and any effect on firm value of changes in capital structure accrue directly to the equity shareholders.

A PDMP on the part of management is not an appealing assumption. For example, if the target debt to value ratio is set at 40% and subsequent events cause the value of the firm to be revised downwards by 50% then a PDMP would result in the actual debt to value ratio doubling to 80%. In practice it may well be that firms do not adjust their capital structures instantaneously to unexpected changes in value. With the existence of significant flotation costs in practice, firms will want to minimise the sum of issue costs and the costs of deviating from their target capital structures. A lagged adjustment may be a more accurate description of what occurs in practice. In addition, because of the various agency and bankruptcy problems associated with debt, it may be that book values as well as market values affect the debt management policy. Alternatively a firm's capital structure may be best explained by the modified pecking order story as put forward by Myers (1984).[2] However at the other extreme to a PDMP, and one more logically consistent with the theory of capital structure in an MM perfect capital market, is an active debt management policy (ADMP). Under an ADMP the firm's debt is constantly monitored and rebalanced each period in response to unfolding events so as to maintain constant the ratio of debt to realised market values. If expected future cash flows are revised upwards or downwards through time then there will be respectively larger issues of debt or larger debt redemptions (or market repurchases) than were originally anticipated.

Adopting the assumption of an ADMP has important implications for the appropriate capitalisation rate for the firm's future debt interest tax shields. Under an ADMP the level of debt is known one period in advance since it is set each period with respect to the opening market value of the firm. The corresponding one period discount rate for the interest tax shields is therefore the debt rate of interest as under a PDMP. However, as clearly demonstrated by Miles and Ezzell (1980), in discounting these values back to the present, the levels of debt and the corresponding values of the interest tax shields are uncertain, being perfectly correlated with the value of the firm's unlevered operating cash flows. Therefore the appropriate capitalisation rate for these one-period discounted tax shields is the unlevered equity rate of return. This line of argument results in the Miles-Ezzell adjusted discount rate formula for valuing a levered cash flow stream:

$$V_L = \sum_{t=1}^{T} \frac{X_t}{(1+r^*)^t} \tag{2}$$

where

$V_L$ = the present value of the levered cash flow stream
$X_t$ = the unlevered expected after-tax operating cash flow in period $t$
$r^*$ = a constant risk adjusted discount rate.

The adjusted discount rate, $r^*$, is specified as

$$r^* = r_U - T_C r_D L \left(\frac{1+r_U}{1+r_D}\right) \tag{3}$$

where

$r_U$ = the unlevered equity rate of return
$T_C$ = the Corporation Tax rate
$r_D$ = the return on debt
$L$ = the firm's ratio of debt to market value.

Miles and Ezzell (1980) have also shown that it is only under an ADMP that the textbook weighted average cost of capital is the appropriate discount rate for finite-lived investment projects that represent a pure change of scale for the firm's operations.

More recently, Lewellen and Emery (1986) have considered the implications of an ADMP for the value of the firm. Assuming that the firm's cash flows are a level perpetuity allows equation (2) to be written as:

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[2] Actual evidence on the financing choices of UK companies is scarce. Marsh (1982) found that in choosing between debt and equity, companies do appear to have target levels of debt in mind but that they are also heavily influenced by market conditions and the history of security prices.

$$V_L = V_U + T_C r_D D/(1 + r_D) + \frac{T_C r_D D/(1 + r_D)}{r_U} \qquad (4)$$

Equation (4) differs from equation (1) in the valuation of the debt interest tax shields. In equation (4) the second term on the right hand side is the present value of the first period's tax shield. Here the associated debt level is known for certain at time zero and so the appropriate discount rate is $r_D$. The third term gives the value of interest tax shields beyond period one. These are discounted for one period at $r_D$ because the associated debt levels are set at the beginning of the relevant period. The firm then has a perpetual cash flow equal to these one-period discounted values. But the appropriate capitalisation rate now is the unlevered equity rate, $r_U$.

## Beta degearing formulas

It should not be surprising given the two valuation equations (1) and (4), which derive from the alternative debt management policies, that the beta degearing formulas consistent with equations (1) and (4) also differ.

Buckley's (1981) result on degearing betas can be easily derived. From equation (1) and the properties of betas we have:

$$\beta_L = \beta_U \frac{V_U}{V_L} + \beta_D \frac{T_C D}{V_L} \qquad (5)$$

where $\beta_L$, $\beta_U$ and $\beta_D$ are the betas of the levered firm, of the unlevered firm and of the debt respectively. In equation (5), consistent with a PDMP, the riskiness of the debt interest tax shield is captured by the debt beta.

We also know that the beta of the levered firm is a weighted average of its equity and debt betas:

$$\beta_L = \beta_E \frac{E}{V_L} + \beta_D \frac{D}{V_L} \qquad (6)$$

where $E$ is the market value of equity in the levered firm's capital structure. Equating (5) and (6) and solving for $\beta_E$ gives:

$$\beta_E = \beta_U \frac{V_U}{E} - \beta_D (1 - T_C) \frac{D}{E} \qquad (7)$$

Substituting for $V_U$ from equation (1) into equation (7) then gives:

$$\beta_E = \beta_U + (\beta_U - \beta_D)(1 - T_C) \frac{D}{E} \qquad (8)$$

Equation (8) is equivalent to Buckley's degearing formula (Buckley, 1981, p. 123).

An identical procedure can be used to derive a degearing formula corresponding to equation (4). Again from the properties of betas and equation (4) we have:

$$\beta_L = \beta_U \frac{V_U}{V_L} + \beta_D \frac{T_C r_D D/(1 + r_D)}{V_L} + \beta_U \frac{[T_C r_D D/(1 + r_D)]/r_U}{V_L} \qquad (9)$$

In equation (9) the riskiness of the first period's debt interest tax shield is captured by the debt beta. But the perpetuity of (one-period discounted) tax shields beyond period one has the same risk as the unlevered cash flows and so the appropriate beta is the unlevered beta.

Equation (6) holds as before, so equating (6) and (9) and solving for $\beta_E$ gives:

$$\beta_E = \beta_U \frac{V_U}{E} + \beta_D \left(1 - \frac{r_D}{1 + r_D} T_C\right) \frac{D}{E} + \beta_U \frac{r_D T_C / r_U}{1 + r_D} \frac{D}{E} \qquad (10)$$

Substituting for $V_U$ from equation (4) into (10), the final term cancels leaving:

$$\beta_E = \beta_U + (\beta_U - \beta_D) \left(1 - \frac{r_D}{1 + r_D} T_C\right) \frac{D}{E} \qquad (11)$$

Equation (11) gives the relationship between beta geared and beta ungeared under an ADMP. It is this beta formula that allows the Miles-Ezzell risk adjusted discount rate to be reconciled with their version of the weighted average cost of capital (Appleyard and Strong, 1988).

Following on from Buckley's analysis of the quantitative effect of using the PDMP degearing formula as fully specified as against the approximation which assumes riskless debt, it is useful to contrast the effects of using the two fully specified beta degearing formulas. Assuming a marginal corporation tax rate of 35%, a return on debt of 10% and a debt beta of 0.3,[3] Figure 1 plots the relationship between beta geared and beta ungeared for a target debt to value ratio of 40%.

## Personal taxes and debt related costs

In the previous discussion it was assumed that the marginal benefit to debt financing was given by the statutory corporation tax rate. This assumes an MM perfect capital market with corporation tax, where personal taxes are either non-existent or equal across debt and equity income, and where firms expect to be profitable enough to pay tax at the full rate. With the introduction of personal tax rates, the parameter measuring the marginal benefit to debt financing will change but the basic

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[3] These might correspond to a market premium of 8% and a risk-free rate of 7.6%.

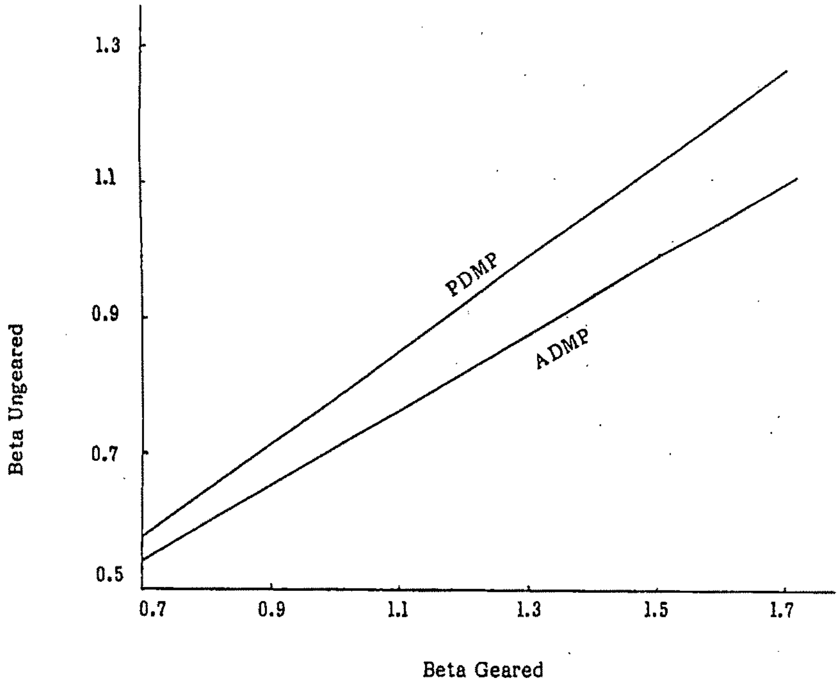

**Figure 1. Relationship between beta geared and beta ungeared under passive and active debt management policies $T_C = 35\%$, $r_D = 10\%$, $\beta_D = 0.3$, D/V = 40%.**

form of the previous equations will remain unchanged.

Assuming uniform marginal personal tax rates of $T_{PD}$ and $T_{PE}$ on debt and equity income respectively,[4] the marginal benefit to debt financing can now be calculated as follows. If £1 of operating earnings is paid out to equity shareholders, their income after all taxes, corporate and personal, is:

$$(1 - T_C)(1 - T_{PE}) \qquad (12)$$

If the same £1 of operating earnings is paid out to debtholders, their after-tax income is:

$$(1 - T_{PD}) \qquad (13)$$

Therefore, the effect of switching £1 of operating earnings from shareholders to debtholders is given by (13) less (12):

$$(1 - T_{PD}) - (1 - T_C)(1 - T_{PE}) \qquad (14)$$

In a perpetuity setting, from (14) the shareholders will have a level perpetual debt interest tax shield of:

$$[(1 - T_{PD}) - (1 - T_C)(1 - T_{PE})]r_D D \qquad (15)$$

Now, under a PDMP, equity shareholders will require the same after-tax return on these tax shields as the debtholders receive on their loan. Therefore, the appropriate rate for capitalising these tax shields is:

$$r_E(1 - T_{PE}) = r_D(1 - T_{PD}) \qquad (16)$$

Using the discount rate in equation (16) to capitalise the interest tax shield in (15) gives the equivalent formula to equation (1) in the presence of corporate and personal taxes:

$$V_L = V_U + \left[1 - \frac{(1 - T_C)(1 - T_{PE})}{(1 - T_{PD})}\right]D \qquad (17)$$

Denoting the square bracketed term in (17) as $T$, equations (5)–(8) clearly follow with $T$ substituted for $T_C$.

Under an ADMP, by a parallel argument, the firm has a debt interest tax shield one period away of:

$$[(1 - T_{PD}) - (1 - T_C)(1 - T_{PE})]r_D D \qquad (18)$$

which is regarded as being of equivalent risk to the debt interest payment itself. The return after all taxes that shareholders require on this tax shield must again be the same in equilibrium as the equivalent after-tax return received by debtholders. The present value of this first period tax shield is thus:

$$\frac{[(1 - T_{PD}) - (1 - T_C)(1 - T_{PE})]r_D D}{1 + r_D(1 - T_{PD})} \qquad (19)$$

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[4] In keeping with the standard treatment in the literature no distinction is made here between tax on dividend income and on capital gains, $T_{PE}$ being a composite rate across the two.

Beyond period one, the firm expects a level perpetual tax shield given by (18). The debt levels on which these tax shields are calculated are known one period in advance and so, over the period, the interest tax shields are regarded by the equity shareholders as being of equivalent risk to the debt interest payments themselves. But prior to this these tax shields are now regarded as being of equivalent risk to the unlevered cash flows. The value of this level perpetuity of interest tax shields is therefore:

$$\frac{[(1-T_{PD})-(1-T_C)(1-T_{PE})]r_D D/[1+r_D(1-T_{PD})]}{r_U(1-T_{PE})} \quad (20)$$

From (19) and (20), the formula corresponding to equation (4) under corporate and personal taxes can now be written as:

$$V_L = V_U + \frac{T^* r_D D}{1+r_D(1-T_{PD})} + \frac{T^* r_D D/[1+r_D(1-T_{PD})]}{r_U(1-T_{PE})} \quad (21)$$

where

$$T^* = (1-T_{PD})-(1-T_C)(1-T_{PE}).$$

Repeating the derivation in equations (9)–(11) shows that the relationship between beta geared and beta ungeared is now:

$$\beta_E = \beta_U + (\beta_U - \beta_D)\left(1 - \frac{r_D}{1+r_D(1-T_{PD})}T^*\right)\frac{D}{E} \quad (22)$$

The previous formulas can also be adjusted to take into account other debt related costs.[5] With debt related costs, (14) is adjusted to:

$$(1-T_{PD})-(1-T_c)(1-T_{PE})-c(D) \quad (23)$$

where $c(D)$ is the marginal debt related cost calculated after all taxes and assumed to be an increasing function of the proportion of debt in the firm's capital structure. We will assume that the inclusion of these costs has no effect on the previous arguments over the appropriate capitalisation rates for the debt interest tax shields. It follows that under a PDMP the parameter $T$ becomes:

$$T = 1 - \frac{(1-T_C)(1-T_{PE})-c(D)}{(1-T_{PD})} \quad (24)$$

Similarly, under an ADMP the parameter $T^*$ becomes:

$$(1-T_{PD})-(1-T_C)(1-T_{PE})-c(D) \quad (25)$$

and equations (21) and (22) still apply with this redefinition of $T^*$.

## Conclusions

This paper reconsiders the formulas for degearing the equity beta of a geared firm. We find that the appropriate formula is determined by the debt management policy of the firm. Previously published formulas implicitly assume that the firm is pursuing a passive debt management policy under which debt levels are fully specified and fixed in advance. A more appealing assumption is that the firm follows an active debt management policy under which the level of debt is continually monitored and rebalanced each period to maintain the firm's target ratio of debt to realised market value. We have derived the relevant beta degearing formula for this alternative debt management policy in an MM perfect capital market with corporation tax and we have extended this to allow for personal taxes and debt related costs. The alternative beta degearing formulas presented here have practical application in empirical studies of equity returns and in capital budgeting analysis, where previously authors have automatically assumed the validity of the formulas corresponding to a PDMP.

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[5] For a discussion of possible debt related costs see Jensen and Meckling (1976), Myers (1977) and Barnea, Haugen and Senbet (1985).

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# Auditors' Duty of Care to Third Parties: A Comment on Judicial Reasoning Underlying US Cases

**H. David Brecht***

**Abstract**—Gwilliam (1987) examined UK and Commonwealth legal cases regarding auditors' duty of care to third parties. This article adds an examination of judicial reasoning in precedent-setting US cases deciding duty to third parties. The UK, Commonwealth and US cases indicate that, while pressures to expand duty are not consistent across legal jurisdictions, they do span international jurisdictions and are similarly based on protecting public interests by providing remedy at law rather than protecting the profession's capacity to serve the public.

Gwilliam (1987) examines UK and Commonwealth legal cases regarding auditors' duty of care to third parties. He finds a long-term trend expanding auditors' duty from (1) only to clients and others in a contractual or fiduciary relationship, to (2) specific third parties known to be relying on the statements, to (3) limited classes of third parties known to be relying on the statments, to (4) third parties whose future reliance on the statements can reasonably be foreseen as a consequence of their dealing with the client.

Gwilliam (1987, p. 35) draws from various courts' reasoning, concluding that duty of care to relying parties does not seem unreasonable and that it is not necessarily appropriate that they must protect themselves. He notes (pp. 25, 34) two elements in determining auditors' duty: (1) consideration of various factors which may offset expanded duty and (2) the difficulty courts have in reconciling the need for reliable audited financial statement information with the perils of exposing auditors to unlimited liability.

Gwilliam's reference to US case law is limited to *Ultramares v. Touche* (1931) which was decided by New York State's highest court. This precedent protected the profession from threat of economic ruin by holding a duty of care only to parties named in contract. However, some states' judicial reasoning has moved far beyond this position to expand auditors' duty. This article adds to Gwilliam's work an examination of judicial reasoning in precedent-setting[1] US cases.

## US legal background: *Ultramares*

In the US, public accounting is regulated at the state level of government and actions in tort law[2] are brought in state courts. (When a tort action is brought in a federal court, that court must apply the law of the state in which the tort was committed.) Auditors' duty to exercise care is defined individually by the various states' supreme courts so that different judicial reasoning and rules of law can and do exist across the states.

*Ultramares v. Touche* (1931) shielded negligent auditors from liability to third parties, establishing the US legal environment for much of this century. *Ultramares* is based on the public policy that auditors must be protected from legal exposure if their service to the public is to survive. Unlimited exposure threatens catastrophic economic loss which cannot be effectively planned for or hedged against by charging fees commensurate with the level of risk, taking actions in performing the audit to reduce the likelihood of loss to future relying third parties, or insuring against inestimable and unrestricted loss.

In *Ultramares* (1931, pp. 447–88), the New York Court of Appeals also expressed its understanding of the economic and social environment in which auditors provide service and commented on other public policies underlying the protection of auditors:

1. The court rejected holding auditors to owe a duty of care to third parties, commenting that

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*The author is professor of accountancy in the School of Business and Public Administration, California State University, Sacramento. He thanks June A. Horrigan, professor of law, for participation in the research for this paper.

[1] No evaluative comparison or prediction of relative influence among cases is made. The emphasis is on the alternative reasoning found.

[2] In US tort law the plaintiff argues that for public policy reasons the defendant has a duty of a more general nature than specified in contract, i.e. a duty of care to the plaintiff. A court's acceptance of public policy forms a basis for establishing the rule of law.

'... public accountants are public only in the sense that their services are offered to any one who chooses to employ them.'

2. The court rejected a potential consequence of holding auditors liable for negligence to third parties, fearing that other professions would have the same duty imposed on them.

3. The court rejected injecting suspicion into the auditor-client relationship by holding an auditor to have a duty to the public, which sometimes would be stricter than that to the client. It feared that the auditor, being suspicious of the client, would reject otherwise plausible explanations and reasonable omissions.

However, within the sixteen years preceding *Ultramares* the New York Court of Appeals established judicial reasoning and rules of law that provide fundamental support for the modern era of expanding professional liability. *MacPherson v. Buick Motor Company* (1916), a personal injury case, held that a manufacturer owed a duty of care to the reasonably foreseeable purchaser of an automobile even though there was no contract between them. In *Glanzer v. Shepard* (1922), an economic injury case, a duty of care was held owed by a public weigher to a specifically foreseen third party where the weigher was in a common calling and the benefit to the third party was the end and aim of the service.

Thus reasoning of the New York Court of Appeals is quoted by some state courts in restricting auditors' duty of care and by others in expanding duty. For example, in *Credit Alliance Corp. v. Arthur Andersen* (1985), the New York Court of Appeals reiterates and specifically states its intention to preserve the public policy of *Ultramares* and additionally reaffirms the *Glanzer* doctrine. This court rules auditors liable for negligence only to parties in contract (privity) and to foreseen parties where the auditors have exhibited some conduct linking them to the third parties and where that conduct evidences their understanding of the parties' reliance.

But in *International Mortgage Company* (1986), a California court of appeals (the highest California court being the Supreme Court), cited *MacPherson* as quoted in *Glanzer* in holding auditors to owe a duty of care to foreseeable third parties and thus expanding their duty. In *Rosenblum v. Adler*, the New Jersey Supreme Court similarly cited *Macpherson* in holding auditors to have a duty of care to foreseeable third parties.

## Duty to foreseen parties

The American Law Institute in the *Restatement of Torts (Second)* (1977), whose positions are often used by US courts in making rulings, adopted a position broader than *Glanzer* and applied it to auditors. *Glanzer* holds duty to specifically foreseen third parties for whose benefit the transaction was the end and aim. The *Restatement* position extends duty to members of a limited class of third parties to whom the auditor intends to supply information or to whom the auditor knows the client will supply information.

The *Glanzer* and *Restatement* positions are thus consistent with the public policy of limiting auditors' liability to a relatively small, known group of potential plaintiffs, allowing the auditor to plan for and hedge the exposure. Moreover, the *Restatement* (1977, comment A) states: '... limiting the liability for negligence of a supplier of information to be used in commercial transactions ..., the law promotes the important social policy of encouraging the flow of commercial information upon which the operation of the economy rests.' The *Glanzer* and *Restatement* positions are cited by many US courts expanding auditors' duty.

A case which set precedent in expanding auditors' duty is *Rusch Factors v. Levin* (1968). This case was heard by a federal court sitting in the state of Rhode Island where there was no precedent for auditors' duty of care to third parties. The court rejected the reasoning of *Ultramares*, stating: 'The wisdom of the decision in *Ultramares* has been doubted, ... and this Court shares the doubt' (*Rusch Factors*, 1968, pp. 90–1).

*Rusch Factors* cited the *Glanzer* precedent and a draft of the *Restatement*, holding auditors to owe a duty of care to a limited class of foreseen third parties—which met the facts of the case. But the court's opinion implies advocacy of public policies to further expand auditors' duty (*Rusch Factors*, 1968, pp. 91, 93). The reasoning advanced by the court was stated as questions, i.e. the court wondered why new public policies would not be more appropriate than the *Ultramares* policy:

1. 'Why should an innocent party be forced to carry the weighty burden of an accountant's professional malpractice?'. At issue is whether societal interests allow an auditor to abide by terms of a contract which foreseeably put parties not in contract at risk of economic injury, and not be liable for damages.

2. 'Isn't the risk of loss more easily distributed and fairly spread by imposing it on the accounting profession, which can pass the cost of insuring against the risk onto its customers, who can in turn pass the cost onto the entire consuming public?'. It is assumed here that the risk of loss is insurable and that such insurance is in fact affordable—assumptions which have been in doubt in the recent US insurance crisis of unavailable coverage and sharply rising premiums.

3. '... wouldn't a rule of foreseeability elevate the cautionary techniques of the accounting profession?'.

## Public trust policy

A central public policy underlying expanded auditors' duty is that of public trust. It reasons that parties should be protected from negligence where a defendant offers a service for the public's benefit and in response a plaintiff relies on that service to his economic loss. Public trust policy was articulated by the chief justice of the United States Supreme Court in *U.S. v. Arthur Young*[3] although the court did not rule on the question of auditors' duty.

Recently, state courts have used public trust policy as the basis for expanding auditors' duty of care to foreseeable third parties. In *Rosenblum v. Adler*, the New Jersey Supreme Court held auditors to owe a duty of care to all reasonably foreseeable third parties relying on the financial statements pursuant to proper business purposes. The court held that the reasonably foreseeable consequences of a negligent act should define the duty of the auditor and the limits of his liability.[4]

In *International Mortgage Corp. v. John P. Butler Accountancy Corp.* (1986, p. 658), a California appellate court similarly argues public trust policy in holding auditors to owe a duty of care to reasonably foreseeable third parties: 'We have determined the protectionist rule of privity announced in *Ultramares* is no longer viable, for the role of the accountant in our modern society has changed. At the time of *Ultramares*, the primary obligation of the auditor was to the client who hired him or her to detect fraud... the accountant... today occupies a position of public trust.'

A sense of what is fair interconnects with a perception of auditing having been delegated a function by society and the public's consequent reliance being effectively involuntary.

## Contribution to harm policy

The public policy of contribution to harm is that economic loss belongs to the party responsible for causing it. This policy is rooted in the concept that all persons in society are generally required to exert care in their conduct to prevent others from being harmed. *Rusch Factors* states this policy in the form of a question, which has been cited in *Rosenblum* and *International Mortgage*. *Ultramares* implicitly rejects application of this policy in holding that duty exists only for obligations contracted for.

As used in *Rosenblum* and *International Mortgage* to extend auditors' liability, the issue is a question of justice, i.e. liability runs to the tortfeasor. *International Mortgage* (1986, p. 658) states: 'every one is responsible ... for the result of his acts [and]... for an injury occasioned... by his want of ordinary care... we refuse to accept the premise that absent duty a person is free to be as negligent as they choose.'

## Risk and loss spreading policy

The public policy of risk and loss spreading, also phrased as a question in *Rusch Factors*, embodies the philosophy that one or a few persons should not be forced by circumstances to bear a significant financial loss caused by the negligence of another. Instead, this loss can be spread over a large number of people who individually endure a very small loss. *Rusch Factors*' question has been cited and this policy applied in *Rosenblum* and *International Mortgage*.

An important assumption is found in the application of this policy. Risk of loss is viewed as more easily spread by imposing it on auditors who have hedged the loss by insurance. The *Rosenblum* (1983, pp. 151–2) court assumed insurability and questioned the reasonableness of fearing financial catastrophe as a result of holding negligent auditors to owe a duty of care to foreseeable third parties.

## Deterrence policy

The public policy of deterrence, phrased as a third question in *Rusch Factors*, places the burden of loss on the auditor as best able to act to avoid future negligence and its consequences. The *Rusch Factors* question is cited by the *Rosenblum* and *International Mortgage* courts.

It is implicit in the effective application of this policy that the auditor is able and will be motivated to prevent third party losses by taking actions to avoid negligence. In a case involving an institutional lender the California Supreme Court found the defendent liable and declared: '...[rules of law] that tend to discourage misconduct are particularly appropriate when applied to an established industry' (Manning, 1981, p. 99).

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[3] 'By certifying the public reports that collectively depict a corporation's financial status, the independent auditor assumes a public responsibility transcending any employment relationship with the client. The independent public accountant performing this special function owes ultimate allegiance to the corporation's stockholders as well as to the investing public. This 'public watchdog' function demands that the accountant maintain total independence from the client at all times and requires complete fidelity to the public trust', *U.S. v. Arthur Young* (1984, p. 1503).

[4] '[negligent misrepresentation] need not be a factual report, but may consist of an expert opinion. Jurisdiction of the imposition of a duty of care upon the speaker is found in the respective positions of the one making the representation and the relying party, the former purporting to exercise the skill and competency compatible with his profession..., the latter openly placing his faith on such reputed skill. It is now well recognized that the audited statements are made for the use of third parties who have no contractual relationship with the auditor... The [Securities and Exchange Commission] twenty-five years ago stated "the responsibility of a public accountant is not only to the client who pays his fee, but also to investors, creditors and others who may rely on the financial statements which he certifies" ', *Rosenblum* (1983, pp. 143, 149).

## Policy of one tort law for all professions

The public policy of one tort law for all professions argues that '[it] is only reasonable that the same judicial criteria govern the imposition of negligence liability, regardless of the defendant's profession' (*International Mortgage*, 1986, p. 658). This policy was applied to auditors to restrict liability in *Ultramares* (1931) at a time when the professions did not have a duty of care to third parties.

By 1983, the professions' duty to third parties had changed dramatically from what existed at the time of *Ultramares*. The *Rosenblum* (1983, p. 153) court expanded auditors' duty of care in New Jersey to what already had been imposed on other professions, stating '[It] is just and rational judicial policy that the same criteria govern the imposition of negligence liability, regardless of the context in which it arises'. In 1986 *International Mortgage* similarly expanded auditors' liability in California, citing attorneys, notaries public, manufacturers, general contractors, psychiatrists, architects, engineers and physicians as precedents. Also, the Wisconsin Supreme Court in *Citizens State Bank v. Timm, Schmidt and Co.* (1983, p. 366) stated a presumption in favour of this policy.

## Summary

In the US, individual state courts balance policies in the public interest to determine to whom auditors owe duty. With many state courts, available public policies are variously balanced and rules of tort law vary across the states. There is no uniform interpretation of the public interest and no uniform rule governing auditors' duty of care to third parties.

For example, *Credit Alliance* (New York), *Rosenblum* (New Jersey) and *International Mortgage* (California) were all decided in the period 1983–86 and were presented with essentially the same facts of auditing's role in the economy. The New York Court of Appeals restricted auditors' duty, reaffirming the *Ultramares* and *Glanzer* doctrines in ruling auditors to owe a duty of care only to parties in privity and to foreseen parties where the auditors have exhibited some conduct linking them to the third parties and where that conduct evidences their understanding of the parties' reliance. This court reaffirmed the public policy of protecting the auditing profession from economic catastrophe as a potential consequence of unrestricted legal exposure.

*Rosenblum* and *International Mortgage* rejected the public policy underlying *Ultramares*, expanding auditors' duty of care to reasonably foreseeable third parties. The *International Mortgage* (1986, p. 658) court weighed a number of public policies and concluded: '... we find no societal considerations sufficient to create an exception to California's well established general principles of tort liability'. Similarly, the Wisconsin Supreme Court in *Citizens State Bank* (1983, p. 366) stated that the policy factors supporting extension of auditors' duty of care only to foreseen classes of third parties were too restrictive to adopt.

Overall, the UK, Commonwealth and US legal cases (cited by Gwilliam and here) indicate that while pressures to expand duty of care are not consistent across legal jurisdictions, they do span international jurisdictions and are similarly based on protecting public interests by providing remedy at law rather than protecting the profession's capacity to serve the public.

In the US the expansion of auditors' duty of care to third parties has its basis in judicial reasoning that has been developing and applied to other professions for over sixty-four years. Liability-expanding public policies and a duty of care to foreseen parties have been applied to auditors for over eighteen years. Recently, rules of law holding auditors to owe a duty of care to foreseeable third parties have emerged in a few pro-active legal jurisdictions.

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# Book Reviews

**Accounting Theory and Policy: A Reader.** *Robert Bloom and Pieter T. Elgers (eds.).* Harcourt Brace Jovanovich, 2nd ed., 1987. xi + 654 pp. £16.95.

This is an expanded and updated version of the authors' 1981 collection of readings for senior undergraduate and postgraduate accounting students. The expansion is considerable with an increase from 37 to 45 articles, of which 30 are new to the collection. The main changes are the inclusion of new sections on agency theory and international accounting and a commitment to presenting contrasting points of view on many of the specific topics covered.

The book is divided into five Sections: I Foundations, II Income Measurement, III Accounting for Changing Prices, IV International Accounting, V Expansion in the Contents of Financial Reports. The five sections are of very different lengths and, at 303 pages, Section I dominates the book with its coverage of the nature of accounting theory (10 articles), agency theory (3), capital market efficiency (3) and economic consequences (2).

Half of the 18 articles in Section I will be familiar to users of the first edition and it comes as no surprise to find that three of the new articles feature the names of Zimmerman or Watts and Zimmerman. These names were absent from the list of authors for the 1981 edition, which reminds us just how recent has been their rise to fame. The three articles now included are a piece on 'Positive Research in Accounting' (Zimmerman 1980), the now famous 'Excuses' paper (Watts and Zimmerman 1979) and 'Towards a Positive Theory of the Determination of Accounting Standards' (Watts and Zimmerman 1978). Other newcomers to the collection include Benston on the methods, benefits and costs of standards; both Wyatt and Deitrick and Harrison on efficient markets and accounting; and Miller and Peasnell, respectively, on conceptual frameworks.

The first edition contained a large section on income measurement, asset valuation and changing prices. In the second edition, this has been divided into two. Section II 'Income Measurement' contains just three articles, two well-known articles on the concept of income by Boulding and Sterling, respectively, and a neat six-page article on the allocation problem by Thomas. Section III 'Accounting for Changing Prices' contains six articles of which only one, the Chambers 1975 Exposure Draft 'Accounting for Inflation', appeared in the first edition. The other five articles by Chasteen, Sterling, Bell, Lemke and Buckmaster have all been published since 1980.

Chasteen provides a brief taxonomy of price change models, Sterling compares costs and exit values and Bell provides a few thoughts on recent attempts at reform in Great Britain and the USA. Lemke reviews the respective arguments for financial and physical capital maintenance and Buckmaster provides an historical perspective on the measurement of monetary gains and losses.

The nine articles in Sections II and III provide a good sampler on income measurement and accounting for changing prices. However, they also have the advantage of complementing the more substantial coverage of the topic in the second edition of *Readings in the Concept and Measurement of Income* (Parker, Harcourt and Whittington). Only one article, 'Economic and Accounting Concepts of Income', by Solomons appears in both volumes.

Section IV 'International Accounting' contains both a general article on international harmonisation (Barbara S. Thomas) and a more specific article on international harmonisation and developing countries (Samuels and Oliga) as well as articles on the 'Functional Currency Choice' (Revsine), Soviet Accounting (Gorelik) and the well-known article on the Accounting Court in The Netherlands (Klaassen). For me the decision to include these articles seems questionable. While the book is enlarged considerably, the inclusion of just five articles cannot possibly do justice to the rapidly expanding subject of international accounting. While the 1984 article by Revsine is extremely useful in any attempt to understand the choice of translation method for foreign financial statements so poorly explained in FASB Statement No. 52 and SSAP 20, the articles by Gorelik (1973) and, to a lesser extent, Klaassen (1980) seem to be somewhat dated. For the British user, the absence of any article on accounting harmonisation in the EEC seems a big gap.

The final Section contains articles on pensions (2), deferred income taxes (4), solvency and liquidity (3) and other issues (4) which include the value added statement, a short piece on executory contracts, human capital and social accounting. While interesting, some of the contributions seem rather passé (e.g. Morley's 'The Value Added Statement in Britain') and many of the topics which are controversial in the UK, on which teachers might therefore wish to focus attention, do not appear.

Thus articles on accounting for leases and goodwill, which appeared in the first edition, have been dropped and the controversial topics of accounting for business combinations, groups and off-balance sheet financing do not appear at all.

No collection of readings is going completely to satisfy any teacher. The major strength of this book is undoubtedly the first section of 303 pages. By widening the coverage of the book, the editors have had to be so selective that they have not been able to do justice to many of the topics. Nevertheless the collection provides an enormous amount of useful material in a convenient form and at a reasonable price.

University of Buckingham David Pendrill

**The Corporate Treasury Function.** *J. A. Donaldson.* The Institute of Chartered Accountants of Scotland, 1988. 71 pp. £5.00.

A distinct treasury profession has emerged in the United Kingdom during the last 20 years largely because firms face an increasingly complex and volatile financial environment. Until the formation of the Association of Corporate Treasurers in 1979, these developments went relatively unnoticed and even today there are misconceptions amongst accountants and others as to what treasurers actually do. This confusion makes the topic an appropriate choice for the Institute's series of monographs, which aim to explain difficult concepts in an understandable way.

After a brief introduction, which discusses the roots of the treasurer's role and a history of the developments to date, the monograph divides the activities of the corporate treasury function into five main areas. The first three sections cover short-term cash management, foreign exchange exposure management and funding. These are distinguished as being closely interrelated subjects which involve specific technical expertise from the treasurer. The other two sections are general financial management and relationship banking. The former examines the role of the treasurer in the determination of the financial policy of the organisation in matters as diverse as debt capacity, dividend policy, investor relations and mergers and acquisitions. The latter explores the responsibility of corporate treasurers for establishing and managing the relationship between the company and its bankers.

The author, who worked for over 15 years in corporate treasury management and was the group treasurer for Imperial Chemical Industries, deals with the material in a straightforward manner and gives clear explanations of the reasoning behind the policy options in the various areas. The subject is approached from the practical viewpoint with theoretical contributions in areas such as exchange rate forecasting and capital structure policy largely dismissed. The monograph is refreshingly free of the jargon which inevitably surrounds any profession and makes even relatively simple concepts difficult to grasp. However there are some shortcomings, which mean that the text falls short of giving a wholly satisfactory picture of the corporate treasury function. In the main this is due to the brevity imposed by the nature of the series. As the author points out in the introduction, the text can only 'provide readers with an outline of the activities that are now embraced by the discipline of corporate treasury management as practised in the United Kingdom'. Another deficiency arises from the bias towards the mainstream practice at the expense of portraying the diversity of approaches which exist within United Kingdom businesses. The monograph would have been improved by case study material, like the 'Different businesses need different treasury departments' series in the *Treasurer* magazine, which emphasised the link between the profile of the business and the organisation and role of the corporate treasury function. Finally it would have been advantageous to have a reasonably detailed bibliography to enable those who were interested to explore the field in more detail.

Subject to these qualifications, the monograph provides an excellent introduction to corporate treasury management. It should prove invaluable to businessmen wishing to know something about the subject; while students might find it useful either if they are contemplating a career in this area or require an insight into the practical side of financial management.

University of Exeter P. A. Collier

**The Regulation of Accounting.** *Peter Taylor and Stuart Turley.* Basil Blackwell, 1986.

This is a useful textbook in that it provides a succinct and authoritative description and review of accounting regulation in the UK. Included also are some interesting comparisons with systems in other countries and with developments at the international level of the EEC, IASC and so on. While the book is well organised, clearly written, competent and balanced it is at the same time somewhat bland and unexciting in terms of its contribution to the debate on the relationship between legal as opposed to private regulation.

The first two chapters are devoted to the nature and objectives of accounting regulation and the distinction between public and private regulation. While the cases for and against regulation are considered, a surprising omission is reference to theories of regulation, e.g. public interest versus economic. On the other hand, the analysis of the development and state of accounting regulation in the UK is careful and balanced. The legal framework in the UK is set out in chapter 3 and provides a useful review and concise summary of developments. There is scope here, however, for a little more explanation of changes in the Companies Acts and for some analysis of the influence of the Stock Exchange.

Chapters 4 and 5 review the work of the Accounting Standards Committee and influences on the standard setting process. While a useful, if brief, description of the ASC is given, there is little by way of critical content, nor is there a discussion of extant criticisms of the standard setting process. Influences on standard setting are reviewed but no recognition is given to the stranglehold on the process that is enjoyed by the professional accountancy bodies themselves.

Chapters 6 and 7 provide some interesting discussion and review of evidence of the effects of accounting standards with particular reference to economic consequences. The fundamental question raised here is whether a private sector body has the social legitimacy to make policy choices with significant economic consequences. The authors remain neutral as elsewhere. In practice, economic consequences tend to be an afterthought in ASC deliberations. Forethought, however, might persuade more to realise the impossibility of the ASC's mission under the existing regulatory framework. The monitoring mechanism to support regulation is reviewed in chapter 8 and primarily relates to the role of auditors in the process.

Chapters 9 and 10 provide a useful summary of the international aspects of regulation and also comparisons with regulation in other countries such as the USA, Canada, Australia, France, Germany and the Netherlands. The final chapter of the book speculates very briefly on future developments. Important issues are raised but few suggestions are made as to their resolution. Perhaps some enlightenment will follow the Dearing Committee review, the results of which are expected shortly.

University of Glasgow S. J. Gray

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**The Economic Analysis of Accounting Profitability.** *Jeremy Edwards, John Kay and Colin Mayer.* Clarendon Press, 1987. 133 pp. £6.95 PB.

In this little book, three well-established authors (hereafter EKM) seek to develop a framework wherein accounting information, and specifically accounting rates of return, can be fashioned so as to serve the needs of decision-makers—in particular perhaps in helping them evaluate decisions and performance in terms of the present and immediate past.

There are seven chapters in all. After an Introduction, the authors devote Chapter 2 to formulating a framework to relate accounting rates of profit (ARPs) with the internal rate of return (IRR). Chapters 3 and 4 then show how this framework might be applied over intermediate periods of an asset's life, using a deprival value (DV) approach to valuing assets in the company's books. Chapter 5 is a defence of 'real terms accounting', the argument being that real holding gains should be an integral part of income, and therefore be embodied in the rates of return employed in the earlier chapters. In Chapter 6 the rate of return using that income concept is compared with three other rates of return (nominal and price-level adjusted historical costs and CCA) for some 160 British firms for the years 1966 to 1981. Chapter 7 concludes with a discussion of taxation and measures of accounting profitability.

The centerpiece of the book is a mathematical relationship arrived at in Chapter 2 tying $a_t$'s (accounting rates of profit or ARPs) to the internal rate of return $r$ (IRR), or something very like it over a life of $n$ years, and using only asset book values ($V_t$). The relationship

$$r = \frac{\sum_{t=1}^{n} \frac{a_t V_{t-1}}{(1+r)^t}}{\sum_{t=1}^{n} \frac{V_{t-1}}{(1+r)^t}} \qquad (1)$$

is valid, for any pattern of depreciation employed, and can indeed be used to determine $r$ by trial and error, *independently of any knowledge of cash flows.*[1] In fact cash flows are implicit in the analysis. For the expression also follows from the fact that, where $D_t$ is any given depreciation pattern and $K_0$ an original capital investment, expressions (2) and (3) below are equally valid:

$$\sum_{t=1}^{n} \frac{a_t V_{t-1}}{(1+r)^t} + \sum_{t=1}^{n} \frac{D_t}{(1+r)^t} = K_0 \qquad (2)$$

and

$$\sum_{t=1}^{n} \frac{r V_{t-1}}{(1+r)^t} + \sum_{t=1}^{n} \frac{D_t}{(1+r)^t} = K_0 \qquad (3)$$

Expression (2) merely states that any set of cash flows (income plus depreciation) discounted by a factor $r$ and set equal to $K_0$ will yield an $r$ which is the internal rate of return. Expression (3) establishes that *given the same $D_t$*, there is *a* set of cash flows—different from that in (2)—which makes $D_t$ equal to internal rate depreciation at the same $r$ as in (2). EKM make much of the fact that one can arrive at $r$ directly from the $a_t$'s and $V_t$'s, without knowing the cash flows involved, and this is indeed true. However, cash flows are implicit in the analysis. Since $D_t = V_{t-1} - V_t$, one can arrive at cash flows *and* $r$ employing (2) above, as well as arriving at $r$ employing (1)—in both cases using only $a$'s and $V$'s.

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[1] Other readers may have difficulty with EKM's derivation of this expression (which plays such a critical role in their analysis) from equations 2.4–2.6 (pp. 24–26), as I did. I am indebted to Mark Tippett for showing me how substitution of 2.4 and 2.6 into 2.5, and expansion of the resultant expression, will indeed yield the above result.

But EKM are not really interested in deriving IRR from ARP, for this could stretch over too long a period. The heart of the EKM argument, developed in Chapters 3 and 4, is that if deprival values are used to arrive at $V_t$'s at the beginning and end of some intermediate period—say three or five years—the resultant $r$ established by expression (1) (or by expression (2)), which they label accounting rate of return (ARR), would be not only as useful for decision-making purposes as IRR, but perhaps more useful. And given what many of us believe to be the greater usefulness of current costs as compared with historical costs in evaluating decisions, I certainly agree with them on this... at least up to a point. The deprival values (DV's) they use involve in the usual way a simple choice among actual market values (CC or NRV)—both presumed to exist—on the one hand, and PV on the other, i.e. DV is the lower of CC and 'recoverable amount', which in turn is the higher of PV and NRV. ARR is the rate of return, over the given time period, which makes PV equal to CC. With any plant assets, CC > NRV. Then if $PV > CC > NRV$, $DV = CC$, and $ARR > i$. If $CC > PV > NRV$, $DV = PV$, and $ARR = i$. If $CC > NRV > PV$, $DV = NRV$, and $ARR < i$. Thus, EKM suggest that decisions can be evaluated continuously, largely on the basis that $ARR \gtreqless i$, this relationship being consistent with $PV \gtreqless DV$. If the ARR so derived is greater than the cost of capital (i), there will of course be net positive present value involved in the investment over the plan period, while if i > ARR it will imply an initial value equal to NRV, and the asset should have already been sold. Given the fact that ARR is essentially IRR for a period shorter than the asset's economic life with book value measured as deprival value, there is no problem in this. It provides cut-offs for decisions (replace and/or expand; use but do not replace; sell) in the usual manner, but on the basis of the relationship of ARR to i, rather than PV to CC and NRV.

While EKM build into their decision rule framework some growth considerations and other extensions, the above expresses the core of what they are doing: showing how, when deprival values are employed in calculating book values, accounting rates of return over time can be used, in connection with cost of capital, for simple investment decision-making purposes. It is a nice, simple decision-making framework, for we do not have to know why book (deprival) values change—whether because of wear-and-tear and/or the passage of time (thus involving deprival value depreciation à la Baxter, for example), or because, independent of use, values rise as a result of price changes, or fall as a result of technological change. The EKM framework, however, does not help us (nor does it make any claim to helping us) to decide how profitable an activity is, in comparison with some other activity. Their analysis is based strictly on inequalities, rather than on absolute magnitudes. They suggest an interesting and helpful way to employ accounting rates of return (in a current value accounting context) in a simple decision-making framework. But, I believe that a sizable task remains: for accounting rates of return to be truly useful in a decision-making context, one must move from inequalities to absolute magnitudes, and tie changes in deprival values to reasons for those changes (i.e. to depreciation, obsolescence, and/or price changes independent of these two considerations).

The last three EKM chapters attempt to put what has been set forth in Chapters 2–5 in a somewhat broader context—to justify using a fully-articulated current value/constant purchasing power framework, rather than CCA, and to show how income taxes will affect results. I have only two qualms about the EKM endorsement of 'real terms accounting' in Chapter 5. First, they seem to contribute to the mistaken belief that the income concept thus measured includes both 'realized holding gains... and... unrealized holding gains as well' for 'the accounting measure of profit must include all changes in the value of capital employed' (pp. 69–70). The concept (unlike historical cost income) actually includes *only that portion of realised gains earned in the present period* plus unrealised gains earned in that period, and thus reports *all* the events of the period, *and only* the events of that period.

My second concern about the chapter has to do with EKM's seeming acceptance of the term 'entity approach' to describe a framework wherein physical capital is used as a benchmark for income (albeit they do not endorse the concept in defining income). I very much look forward to the day when 'an entity approach' and 'entity income' will mean simply that differential financing of assets (by creditors vs. owners) is ignored. It might have been helpful if this book had recognised that four current rates of return are useful: $COI_E/DVA$, $CRI_E/DVA$, $COI_P/DVNA$, and $CRI_P/DVNA$, where COI is Current Operating Income, CRI comprehensive Current Real Income (including all real holding gains), subscripts E and P denote Entity and Proprietorship, respectively, and DVA and DVNA are the deprival value of assets and net assets, respectively. The entity-ownership distinction is best based on whether or not interest charges are included in determining COI and real holding gains on liabilities additionally in determining CRI, not on a capital maintenance distinction which can, but should not, be used to distinguish COI and CRI. Entity rates of return as measured in this way are useful for comparing performances independently of how highly one firm may be geared relative to the other.

Finally, the EKM empirical evidence on the four different rates of return for 160 firms, 1966–1981, is interesting, and I was glad to see the authors stressing the carry-over effects of price changes in the accounts. An 'end to inflation' does not mean an 'end' to the usefulness of current cost/real terms accounting information. It may be noted, however, that with a large sample, across industries, the real *realisable holding* gains on assets (which serves as the primary distinction between COI and CRI) will tend to cancel out. For the economy as a whole such gains should cancel out entirely since the general price level index is an average of specific prices. Thus, the rather close similarity between the different rates of return corrected for specific and/or general price level changes in their Table 6.5 is not as surprising as it might appear at first blush.

The authors of this book are to be commended for trying to help make accounting data more useful. If there still is work to be done, EKM have at least pushed the ball along, and very much deserve to be read . . . and then built upon!

Jones Graduate School, Philip W. Bell
Rice University and
The Australian National University

**Domestic and International Banking.** *Mervyn K. Lewis and Kevin T. Davies.* Philip Allan, 1987. 448 pp. £14.95 pbk. £34.50 hbk.

The aim of this book is to integrate three new developments in banking with an analysis of conventional (mainly retail) banking practices. These new developments are the internationalisation of banking, the related growth of wholesale banking and, finally, the emergence of 'off balance sheet' banking business, especially 'securitisation'.

The authors recognise the many sources of change influencing domestic and international banks but argue that banks can best be understood by examining their long established functions. These include the provision of payment services and intermediation services.

The overall package of services including payment service and intermediation services is the focus of chapter 3 on retail banking. Joint production of these is both an evolutionary development in banks and the result of economies in the production and usage of information. More specifically, banks obtain informational advantages by offering payment and deposit services. These are valuable in resolving informational asymmetries between the bank and the borrowing customer.

The intermediation role spans brokerage services to asset tranformation, with off balance sheet services sandwiched somewhere between these roles. The package of information and risk sharing (insurance) services provided to their customers via the intermediation role involves the banks' assuming part of the risk themselves. Banks organise their activities and devise contracts so as to both increase their income and manage the risk. The way in which banks do this forms much of the subject matter of the book.

The authors begin by drawing attention to the similarity between bank and non-bank financial institutions. Heavy use is made of the analogy between bank intermediation and the activities of insurance companies. Thus banks when intermediating between borrowers and lenders and engaging in asset transformation provide insurance services both to depositors and borrowers.

The insurance analogy is used throughout the book but has a specific role in developing new insights into retail banking, wholesale banking, international banking and recent developments in financial markets.

Both retail and wholesale banks write 'insurance' type contracts with depositors and borrowers. Thus personal, corporate and bank depositors are assured that their deposits can be redeemed at full value. Personal, corporate and governmental borrowers are assured that loans will not have to be repaid within the commitment period. Banks are able to meet these contracts by holding reserves and attracting economies of scale through application of the law of large numbers.

These classic principles of banking and insurance are more applicable to retail banking than wholesale banking. In wholesale banking the number of foreign currency and sterling deposits may only be present in the deposit portfolio in double or triple figures. However maturity mismatching is the norm here as in retail banking. The authors argue that the banks circumvent the obvious concentration of risk by spreading the risk outside of the bank. This is done by ceding part of the risk to another bank (reinsurance) or by splitting the risk with other banks (co-insurance). The institutional mechanisms for such risk-spreading or pooling in external banking markets include loan syndication, the interbank market and the development of off balance sheet business.

This analysis unifies much of the argument in later chapters, where the authors seek to explain international aspects of banking.

Syndicated lending in the Euromarkets is seen as an external device to spread credit and default risks too large for individual banks to bear. This practice is in sharp contrast to (domestic) retail lending where diversification of many small loans within the bank provides risk reduction benefits.

In a similar fashion, offshore interbank deposit markets are seen as informal external risk-sharing arrangements. It is this facility which allows international banks to create liquidity and mismatch maturities by borrowing short and lending long. The long chain of depositing and redepositing in these markets is the means by which large deposit risks are shared and the mismatching is distributed across many banks. The latter point seeks to explain the persistence of a high degree of interbank deposits in these markets.

The insurance analogy, viewing international wholesale banks as poolers of risks in external co-insurance and re-insurance markets, is not supported by conclusive empirical evidence. However, the explanation appears to have more power than conventional views and provides a striking contrast with internal risk reduction techniques in retail banking. It is this framework which allows the authors to summarise much institutional material and achieve their aim of describing domestic and international banking in a succinct and related manner.

The book clearly explains new developments in international banking especially the blurring of roles between investment and commercial banking. Particularly useful are the discussions in chapter 10 of the role of interest rate swaps as the means to arbitrage between Eurobond and bank loan markets and the use of Euronotes to bridge maturity differences between bank loan and short term security markets. This, allied to a traditional treatment of syndicated lending, allows the authors to investigate in chapter 11 the nature of securitisation. They point up the vulnerability of banks to changes in the costs of transacting and in acquiring information. These appear to have eroded the boundary between internal and external transacting and enhanced the benefits to borrowers and lenders dealing directly through markets. Unfortunately, there is little or no empirical data on direct and indirect transaction costs and so the authors are restricted to looking at volume changes in the lending and security markets. The absence of such data creates difficulties for all commentators in assessing the likely effects on the banks of this phenomenon. However, the authors place their faith in the adaptability of the banks to such change and expect further innovation from the banks as they further blur the distinction between traditional intermediation and securities dealing.

One test of a book is its use on a course. The book has been used as the core book in a one-term option in a taught Masters course. The students had no prior experience of banking material but had a corporate finance background. The students found it to be a comprehensive and succinct summary of a wide and diverse literature. The clear frame of analysis and the non-mathematical nature of the material meant that the students made rapid progress with the subject and found it valuable in directing them to the literature. Despite the rapid rate of change of the banking world it was up to date and focused on topical subjects.

University of Glasgow John Holland

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**Resource Management in the NHS.** *John Perrin.* Van Nostrand Reinhold (UK), 1988. 190 pp. £15.

This is the first book in a new series on health services management published by VNR in association with the Health Services Management Centre at Birmingham University.

*Resource Management in the NHS* sets out to review the state of the art of NHS financial information and control. The book provides, in ten short chapters, an overview of current developments in financial management, and assesses their potential. Chapters one and two briefly outline the structure of the book and provide the background to the need for improved resource management. In chapter two the author asserts that, by international comparison, the NHS is a low-cost, relatively efficient service. Nonetheless, he points out that, given the government's wish to improve efficiency and effectiveness generally within the public sector, managers and clinicians need to develop and use better management information systems if they do not wish to see themselves in weak bargaining positions in their quest for increased allocations of resources.

The next three chapters explain the 'state of the art' of NHS costing and budgeting up to Körner. Mrs Edith Körner chaired the NHS/DHSS Steering Committee on Health Services Information whose main findings were reported in 1984. The Steering Group sought simplification and standardisation of minimum data requirements and improved management information for use by operational levels of management. Chapter three outlines the basic cost measures and principles. It is pointed out that, because NHS costs are largely 'fixed' within annual budgets, typically 80% or more, the scope for a quick response in making short-run budget adjustments is often limited. Chapter four reviews the basic tenets of budgetary control. Both of these chapters provide the background against which, in chapter five, the current costing and budgetary systems, after the 1982 NHS reorganisation, are reviewed.

Chapter six discusses in some detail the Körner initiative of 'speciality costing'. The attributes of the two general approaches to this topic are considered—statistical speciality costing and speciality costing based on sampling. The former approach arose from the interest of health economists and econometricians, whilst the latter is principally based on the pioneering work of Professor Charles Magee of Cardiff. The chapter concludes with a review of 'continuous' speciality costing. Chapter seven considers clinical management budgets (CMB), as recommended by the NHS Management Inquiry of 1983 (also known, after its chairman, as the Griffiths Report). The author describes CMB as being the next evolutionary stage of NHS financial information development beyond speciality costing. It is an approach that, according to Griffiths, sees budgets as active management tools. Perrin points out that CMB is not a new idea. In fact the author's own *earlier* research work, embodied in the late Royal Commission's Research Paper No. 2 of 1978, made a similar recommendation. Perrin reviews the current status of development of this initiative and points out that it takes at least 3–4 years to introduce a working CMP system in hospitals.

'Resource Management: revenue and capital', is the title of chapter eight. The chapter begins with a discussion on why Griffiths-style CMBs have not yet proven successful. Next Perrin considers what is involved in the recent 'resource management' initiative outlined in 1986. This leads to a discussion on the various research and managerial issues that are converging to make possible management information support systems of greater relevance and value. The chapter concludes with a section devoted to reviewing the need for capital maintenance and deployment, until recently regarded by many managers and clinicians as a free good.

The penultimate chapter considers the progress to date of NHS financial information systems and, in particular, considers the new developments of 'patient costing', where all resource uses are coded to the individual patient and can then be charged (notionally) to him or her, and DRGs (diagnosis related groups) which is a system for classifying resource costs according to their diagnostic status. The concluding chapter reflects on how the developments outlined in the previous nine chapters are likely to develop in the medium to long-term as the NHS approaches the 1990s.

This is a well written book by an author well known for his contributions to the research for improved financial and resource management within the NHS. Though principally designed and written for the decision takers in the NHS (general managers, clinicians, senior nurses, departmental heads and the like), it should also prove useful to those academics, researchers and students who, whilst not having a detailed knowledge of the NHS, are generally interested in the problems of public sector accountability and financial control. Those not familiar with health service jargon will find the glossary particularly useful.

University of Kent at
Canterbury

John J. Glynn

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**An Essay on Recognition (R. J. Chambers Research Lecture 1985).** *Robert R. Sterling.* University of Sydney Press, 1987. xiv + 90pp. No price indicated.

This is the conceptual statement on recognition that the FASB did *not* approve. It was written by Sterling while he was on secondment to the FASB and working on the topic of recognition as part of the conceptual framework project. The volume is of interest partly for what Sterling has to say about recognition and partly for what he has to say about the *realpolitik* of the FASB. As to the latter, Sterling's conclusion is essentially that the political process produces bad philosophy. He feels sure that the FASB rejected his views on recognition because they feared (wrongly, he insists) that he was somehow attempting to smuggle current value past them in disguise.

Sterling puts representational faithfulness squarely at the forefront of his scheme and adopts a 'representationalist' position on recognition:

> My view of course presupposes that the definition of [say] an asset refers to something in the real world. If it does not, then there can be no representational faithfulness because there is nothing to represent. (pp. x–xi)

This is what philosophers would call a correspondence theory of truth. From this position Sterling argues that the question, 'should $x$ be recognised as an asset?' should be operationally equivalent to the question 'is $x$ an asset?'. This is not the approach adopted by the FASB's conceptual framework, which admits of the possibility that some items satisfying the definition of an asset should not be recognised because they fail to satisfy other criteria. Sterling argues that this means that statements would not be representationally faithful. While it would surely be possible to construct some sort of argument to the effect that statements faithfully represented the selection of assets they purported to represent, this could rapidly lead into the downward spiral which ends when the argument becomes: the objective of accountants engaged in the financial reporting process is to carry out the financial reporting process—and no more.

Sterling points out that, from a representationalist position, the argument that measurement can be separated from, and considered after, recognition is wrong, since the totals and subtotals in a statement should 'recognise' real-world phenomena but will not do so if individual items have been measured on inconsistent bases. He argues that the FASB's apparent decision to change the sequence of the conceptual framework project, so as to defer consideration of measurement until after recognition had been dealt with, reflected the emergence of controversy about measurement in the form of the current cost debate: 'the problem is that what may make good political sense does not necessarily make good conceptual sense' (p. 47).

Another consequence of a representationalist position is that whether financial statements should articulate becomes not a matter of choice for the accountant but a reflection of the underlying reality; 'if the phenomena articulate, then financial statements must articulate' (p. 57).

Some of what Sterling says could be disputed even within a representationalist framework. For example, he argues that there is no scope for trade-off between relevance and reliability because 'they perform different roles in the decision process' (p. 30). However, the argument would seem to depend on a view of phenomena as either absolutely relevant or absolutely irrelevant rather than as relatively more or less relevant. Thus, for example, if I am seeking a drink in a rural area I might prefer a map showing roads and churches only, produced to Ordinance Survey standards (on the grounds that this would at least be likely to indicate centres of population) to one purporting to show roads and public houses prepared by a colleague after doing the necessary field-work.

In the main, though, the work represents a useful and forcefully argued statement of the approach to recognition which would follow from the acceptance of a representationalist position. The difficulties encountered by the FASB in completing its framework, though no doubt due in part to the 'politicisation of conceptualisation', also reflect general problems with a correspondence theory of truth, expecially when applied to the kind of objects and events which accountants are expected to depict.

University of Kent at Canterbury Brian A. Rutherford

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**The Management of the Research & Development Function in UK Corporations: Some Empirical Evidence.** *J. Fisher & N. Lothian.* ICAS, 1987. pp 141. £10.

This is more of a research report than a monograph. Here one will find the detailed reporting of survey results but little in the way of background information; reference to other work in the field; or, even, the placing of the results in any context. Its audience must therefore be those with a developed specialist interest in the field of R&D. For those seeking more general information on the nature of R&D, its economic position and the accounting state of the art in this field, then previous work on the UK (Schott, 1981; Lothian, 1983; and Gray, 1986) must be recommended.

The report is effectively an addition to and development of Lothian (1983) and Gray (1986) and is based on the same sort of survey data approach—warts and all. The data were collected by a questionnaire sent to the chief executives of the top 200 UK companies. The questionnaire had been revised from an (unspecified) pilot study. A total of 46 companies responded after a reminder letter was sent. No response bias was detected (using the normal test of results from first and second mailings).

The bulk of Part 1 of the report (42pp.) describes the results of the survey in full with little analysis at this stage. Part 2 of the report consists primarily of an attempted statistical test of a series of hypotheses about the correlation of (a) the size of the company, the ownership (British or overseas) of the company, the industrial sector of the company or its product market; with (b) the management of, or accounting for, R&D activities. As would be predicted by the majority of the literature in this field, this report finds correlations between most of these things.

For those with a developed research interest in this field, the study provides a useful source of update, corroboration and perhaps even development of the current state of knowledge. However, the whole research report lacks many of the trademarks of academic reporting. The use of references is sketchy to the point that it is difficult always to relate the material to previous work in the field. In addition, there are instances of material whose provenance seems familiar but which are not directly supported by reference. This, with a noticeable tendency to assertion in places, makes the whole report a far less satisfactory contribution than the reputation of the authors would suggest.

University of East Anglia R. H. Gray

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Lothian, N. (1983), *How Companies Manage R&D,* CIMA, London.

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**An Anatomy of an Accounting Standard: Accounting for Income Taxes.** *Robert J. Swieringa.* Accounting and Finance Foundation, University of Sydney, 1988. 66 pp. A$15.

As its title suggests, this published version of a lecture is largely a description of the US standard-setting process in the case of deferred tax (SFAS 96, issued at the end of 1987). Consequently, it is not directly a series of arguments on the subject of alternative methods of deferred tax accounting. Indeed, the lecturer, who is a Board member of the FASB, generally manages to disguise his own views on any particular aspect of the technical debate.

The topic is an excellent one to illustrate the FASB's 'due process' and the effects of political lobbying, changes in the tax law, changes in the Board's membership, and so on. The lecture shows how enormously greater are the resources of the FASB than those of the UK's ASC in the 1980s, and how every aspect of a technical problem is agonised over by 7 board members and 40 technical staff as well as by all the external interested parties. SFAS 96 was the result of discussions at 49 Board meetings, many public hearings, meetings with the SEC, and so on. An amended standard in the UK might perhaps have been to three or four ASC meetings and no public hearings, although a working party, usually containing some ASC members, would have met more often.

It is interesting that the FASB's output is nevertheless at least as controversial as the ASC's. Also, despite a substantial effort towards a conceptual framework in the US, few of the Board's decisions were easy to make, and many were only made by '4 to 3' or '5 to 2' majorities.

If the content of the lecture was close to the published version, then the lecture must surely have been rather dry and technical. It must have been hard to follow the blow-by-blow accounts of decisions related to the deferred tax treatment of carryforwards of net operating losses! However, in published form with time to re-read the difficult bits and to think carefully about the numerical examples, the lecture is illuminating. It is to be recommended particularly to those interested in the US regulatory process, and to some extent to those interested in deferred tax.

University of Reading Christopher Nobes

**Product Differentiation in Auditing: Auditor Choice in the Market for Unseasoned New Issues.** *Dan A. Simunic and Michael T. Stein.* Canadian Certified General Accountants' Research Foundation, 1987. x + 71pp.

This research monograph adds to the developing literature concerned with economic analysis of auditing activity, comprising both the analytical models of the economic incentives and relationships involved in auditing, and also descriptive studies of economic variables, for example the pricing of audit services, economic concentration and auditor switching. One problem in this development has been that the analytical models have been abstracted from the complexities of actual auditor-client relationships and have therefore proved difficult to test or to relate to the more descriptive empirical information.

Starting from an agency theory approach Simunic and Stein develop an analytical model of auditor choice, based on top management's desire for particular aspects of 'audit quality', and test this model with reference to a sample of 469 US companies which first issued equity to the public in 1981.

The model building begins from the position that, if the audit is a homogeneous product, i.e. there is no product differentiation, management will have no reason to be concerned over auditor choice or to pay more for particular audit firms. This leads to a discussion of how the quality of auditing services may be differentiated. Simunic and Stein's approach is to translate the notion of quality into a series of three 'service characteristics' which will be influential in management's choice of auditor:

(i) control: 'internal agency' problems mean auditing may be demanded to contribute to organisational control;
(ii) credibility: 'external agency' problems mean auditing may be required to provide credibility; the audit firm's brand name will indicate the credibility to be delivered;
(iii) product line: management may value the scope of services offered, including management advisory services.

This modelling section of the monograph is very well argued. It attempts to get away from the problem of the lack of observability of audit quality to consider more explicitly what management will value from an audit. The treatment of management advisory services is of particular interest as the authors regard these as a component of audit quality, rather than viewing auditing as an independent service. Credibility is still taken as the principal determinant of auditor choice, differences in auditor credibility being a function of demand which in turn depends on differences in company characteristics. Hypotheses based on such characteristics can thus be formed and tested.

Before considering the reported results a few comments on the assumptions in the model may be appropriate. It is assumed throughout that management is the sole purchaser of audit services. The list of three service characteristics may also be incomplete; management may value other attributes. Further, there is an implicit assumption that product line may be treated as a commodity when in fact it too is likely to include a reputational dimension which may be interdependent with that perceived under the credibility attribute. Finally, for the purposes of testing the model, it is assumed that larger audit firms will provide higher quality on all attributes than smaller firms. This seems to preclude the building of particular quality reputations or service expertise by smaller firms.

Given the careful arguments surrounding the model, it is disappointing that the empirical results do not provide it with more support. Hypotheses are framed relating company characteristics to the choice of a larger or smaller audit firm (in this research, Big Eight or smaller firms, excluding medium sized). 'Control' is tested via size and complexity variables, 'credibility' by measures of dispersion of ownership, leverage and the underwriting arrangements for the new issue, and a further hypothesis is set regarding the influence of auditor choice on the value of the company. The product line attribute is tested by the age, growth and regulatory environment of the company, but no formal hypotheses are set.

The results provide strong support for the influence of the 'control' dimension variables, i.e. larger or more complex organisations are more likely to have Big Eight auditors. However, only weak support is offered for other hypotheses, and in the case of leverage the relationship is in the opposite direction to that hypothesized.

Overall, the authors conclude that audit services are not homogeneous. This is not contentious, but the critical question is whether the model offered of product differentiation is a good one. The evidence provided in the monograph is insufficient to support the model conclusively. We are therefore left in the position referred to in the opening paragraph above: that the strong analytical work in the early part of this report is hard to translate into effective and supportive empirical work later on. The authors recognise the need for more development, notably in the area of product line, which is one of the innovative aspects of the model but is rather undeveloped in terms of testable ideas. Additionally the work could be expanded to other samples, as new issues may involve some specific or even irrational aspects of auditor choice. As a piece of research, this monograph is something that others with research interests in this area of auditor choice and the economic incentives associated with auditing will want to have access to, but it achieves only a limited amount in terms of demonstrating the superiority of the emerging framework for continued research in this area.

University of Manchester Stuart Turley

**The Philosophy and Principles of Auditing.** *David Flint.*

Professor Flint has been an influential thinker on auditing for many years and this important book represents a distillation of his thoughts. The book is not intended to be an exhaustive treatise on audit theory but rather an introduction to the subject. It starts with a statement of basic postulates and then explains the principles which guide audit practice. Its format is therefore very similar to the seminal 1961 monograph *The Philosophy of Auditing* by Mautz and Sharaf. Indeed Mautz wrote the preface to the present book. However, although the two books have a similar approach, their contents are substantially different.

Flint's approach is that of a rationalist philosopher as can be seen from the following two extracts:

> There has to be some explanation for Society's acceptance of the worth of what auditors do, and of what the audit contributes to the community wealth or welfare. (p. 4)
>
> [There has to be] an explanation of why auditors do what they do, what they believe they achieve and what the public believes they achieve. (p. 4)

The seven postulates presented in the book are intended to provide the axioms from which a theory of auditing can be developed. There is very little overlap with the eight tentative postulates of auditing of Mautz and Sharaf. This is an advantage for me, because I have always had some difficulty with Mautz and Sharaf's 'postulates', some of which do not seem to be true postulates in the axiomatic sense. In contrast, Flint's seven postulates seem to me to be much more worthy of the name. As these postulates are central to the author's thesis, it is perhaps worthwhile (albeit slightly unfair) to provide a summary of them:

(1) There is a relationship of accountability or a situation of public accountability.

(2) Accountability cannot be demonstrated without an audit.

(3) An audit requires independence and freedom.

(4) The subject matter of audit is susceptible to verification by evidence.

(5) Auditors are skilled judges who are able to measure and compare actual performance against standards of accountability.

(6) The meaning, significance and intention of statements to be audited must be clear.

(7) An audit produces an economic or social benefit.

The seventh postulate gives a clue to another of Flint's philosophical roots: utilitarianism. Indeed, he describes the audit as being 'wholly utilitarian' (p. 14).

This last point brings me to my major disappointment with the book, which is that it does not really explore the philosophical nature of the ethics of auditing. There is a chapter on ethics, but this is very much in the lay usage of the term to mean a set of standards by which the profession decides to regulate its behaviour. The book has 'philosophy' in its title and I would have liked some explanation and analysis of the basic moral tenets of the set of principles, virtues and attitudes recognised by the auditing profession. For example, the utilitarian approach of the postulates contrasts with the deontological nature of the profession's ethical guidelines. In other words, should an auditor always act so as to bring about the best possible results on the whole, or are there certain activities that must be carried out and/or others that must not be undertaken whatever the consequences.

I have dwelt on the philosophical nature of the book, because that is where I think the book has a substantial academic contribution to make. The sections that follow the 'theory' (competence, independence, ethics, evidence, reporting, materiality, due care and negligence, standards of practice and quality control) are well argued and will be useful for students, but they are essentially a statement of best professional practice, reflecting the author's considerable experience in the area. They are an articulate expression of what the audit profession should aspire to and, as such, should provide food for thought for students and practitioners alike. The author has little sympathy for those critics of the concept of a profession and, given the essentially rationalist philosophical position he adopts, it is also not surprising that the book contains no reference to agency theory or information economics.

Professor Flint cares about the profession of auditing and this book is an eloquent statement of the principles which should underlie audit practice. I would urge anyone interested in auditing to read it.

University of Manchester Peter Moizer

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*Accounting and Business Research*, Vol. 19, No. 75, pp. 195–205, 1989

# Accounting Standard Setting in the UK after 20 Years: A Critique of the Dearing and Solomons Reports

**Geoffrey Whittington***

## Introduction

The Accounting Standards Steering Committee (ASSC) came into being on 1st January 1970. This was preceded by a series of controversial events in 1968 and 1969, including the GEC-AEI and Pergamon-Leasco take-overs, which had shaken public confidence in financial accounting, culminating in the public controversy, in the columns of *The Times*, between Prof. Eddie Stamp (then of Edinburgh University) and Sir Ronald Leach (then President of the Institute of Chartered Accountants in England and Wales, ICAEW). It was the ICAEW Council which took the initiative in creating the ASSC.

The ASSC was a self-regulatory private sector body, sponsored by the (then) three Chartered Institutes (the Irish and Scottish Institutes becoming members in 1970), dominated by accountants in public practice, and relying for its authority on its disciplinary powers over individual members of its constituent bodies who were preparers or users of accounts. The ASSC became the Accounting Standards Committee (ASC) in 1975; and in 1971 and 1976 other professional bodies were brought in, so that the Consultative Committee of Accountancy Bodies (CCAB) which controls ASC is now sponsored by all six of the leading accountancy bodies, the newcomers being the Certified Accountants (1971), the Management Accountants (1971), and the Public Sector accountants (1976) (all three bodies have obtained Royal Charters during the period, so that there are now six chartered bodies). There have been periodic reviews of ASC's work, notably the Watts Report (1981), which resulted in a widening of membership in order to relax the apparent grip of the auditing profession on the standard-setting process. However, the basic structure of a self-regulating professional body, constituted of part-time volunteer members, has survived; and in twenty years it has issued twenty-four substantial accounting standards, which are, for the most part, adhered to by users and preparers of accounts. At first blush, this might seem to be a story of unalloyed success: the emergence of a new national institution.

However, all is not well with the ASC. The current volume of Accounting Standards published by the ASC does contain a large number of extant standards, but the largest item in the book is the Handbook on Accounting for Changing Prices, which, whatever its merits, is a confession of failure. The debate on accounting for changing prices absorbed the larger share of ASC's energies from the publication of the first exposure draft (ED8) in 1973 to that of the standard on the subject (SSAP16) in 1980. The subsequent withdrawal of SSAP16, following substantial non-compliance, and the publication of the Handbook (1986) resulted in a serious loss of confidence by and in ASC. This must raise doubts as to ASC's ability to deal adequately with such pressing matters as off-balance sheet financing, which it has addressed in ED42 but which has yet to be developed into a standard. Moreover, on a number of other issues, ASC has either failed to act or has seemed to be very anxious to avoid controversy by accommodating the needs of pressure groups.

ASC's central problem is lack of authority, and some would add to that a lack of direction. The Dearing Report, published late in 1988, addresses the issue of authority and proposes a new structure for accounting standard setting. The Solomons Report, published early in 1989, attempts to deal with the problem of direction by proposing guidelines for reporting standards, or what is popularly known as a conceptual framework. Both reports have appeared at a time when the pressures on ASC are such that change is almost inevitable. It is therefore important to consider not only whether the reports are soundly based on reason and evidence but also whether they point the appropriate direction for practical developments.

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*The author is Price Waterhouse Professor of Accounting in the University of Cambridge.

## The background: problems, pressures and overseas experience

*Problems*

The main problems of ASC were characterised above as lack of authority and lack of direction, i.e. the enforcement of standards is weak and the content of standards is also deficient.

The enforcement problem arises from the fact that ASC is a private sector self-regulatory body, backed merely by professional discipline. Moreover, since accounts are prepared by directors, who may not necessarily be accountants, the discipline may not apply at all: the auditor, who will (with rare exceptions) be a member of a CCAB body, is merely required to report a departure from accounting standards (and then only if the departure is not deemed to be justified by, for example, the over-riding need to present a true and fair view), not to correct the departure.

In an attempt to buttress its authority and enforce a new standard on price change accounting, the ASC sought a legal opinion (the Hoffman-Arden opinon, 1983) as to whether its standards might have some authority under the Companies Act as evidence of the generally accepted accounting principles which give rise to the true and fair view required by the Act. The Hoffman-Arden opinion was that ASC standards could serve such a role, but not if they expressed views which were manifestly not generally accepted. Thus, the ASC cannot claim the authority of generally accepted accounting principles if it attempts to lead current accounting practice rather than following it, e.g. it could not claim that price change accounting was 'generally accepted' when only a small minority of companies was actually using it.

With regard to the content of standards, a widespread criticism is that the ASC has, because of its weak enforcement powers, had to take a consensus view and has frequently changed its mind or made concessions to placate pressure groups. Examples of such cases have occurred in relation to the treatment of research and development expenditure, deferred taxation and investment properties. More fundamentally, ASC has tended to lack a consistent set of central concepts which would lend coherence and consistency to the set of standards as a whole. An obvious example of this problem is the issue of valuation, which emerges from accounting standards with a wide variety of recommended methods (Solomons Report, p. 36). The solution to this problem might be a conceptual framework, of the type recommended by the Solomons Report, if such a framework could be agreed upon and if it were robust enough to deal adequately and consistently with the wide range of problems addressed by accounting standards.

A related dimension of the problem of content, which would have to be addressed by a conceptual framework, is the issue of whether standards should enunciate general principles designed to achieve a true and fair view or should attempt detailed prescription. In the terms used by lawyers, this is the issue of substance over form. British accountants tend to prefer general principles rather than detailed prescriptions, i.e. they prefer to aim to report economic substance rather than legal form. Not surprisingly, lawyers tend to prefer legal form (e.g. see the debate between Tweedie and Kellas (1987) and Aldwinkle (1987)). Economic substance puts great stress on the professional judgement of the accountant and auditor and could be open to abuse or unpredictability due to its high degree of subjectivity. Legal form, on the other hand, lends itself to 'loopholing' and may obstruct the communication of relevant information.

*Pressures*

Most of the above problems have been with the ASC throughout its existence and are, to some extent, likely to be endemic in any private-sector standard-setting body. They have become particularly acute in ASC because of current pressures. Four sources of pressure will be considered: securities markets, the structure of the accounting profession, international developments, and public demand.

Securities markets have become extremely active and competitive in recent years, following the 'Big Bang' in the London Stock Exchange, the increasing internationalisation of securities markets (following the relaxation of exchange controls and improvements in the technology of communication) and the very active market in corporate control (i.e. mergers and take-overs) in the UK. This has increased the incentives for company directors to show their performance in the most favourable light in their accounts, both to defend their company against possible take-overs and to enable their company to take over others on the most favourable terms. This is currently apparent in the controversy over accounting for brand names. Moreover, there has been rapid innovation in the creation of new securities and methods of financing (e.g. deep discount bonds and off-balance sheet financing). These have no doubt improved the financial opportunities available to companies, but they have also created accounting problems, partly because non-traditional transactions simply do not fit in well with traditional accounting practices, but also because the new techniques have sometimes been used deliberately to provide cosmetic improvements to the firm's accounting performance, i.e. the general phenomenon of 'creative accounting' (Griffiths, 1986).

The structure of the accounting profession, or, more strictly, the structure of auditing firms, has also changed in a way which puts strains on accounting standards. The larger auditing firms (which tend to have the strongest presence on professional committees and the ASC) have grown very large indeed, with literally hundreds of partners. Auditing has become large-scale team work. Such an environment is far removed from the traditional idea of the individual professional auditor, exercising personal professional judgement and skill in order to arrive at a true and fair view. The larger scale environment requires rule books, to co-ordinate the large number of individuals involved in the team, and leading firms have devised their own large and comprehensive audit manuals, setting out their standard procedures in detail. Such manuals are most easy to prepare and maintain when they operate within a prescriptive accounting standards regime, which provides a set of specific rules rather than broad principles.

However, there is more than sheer size to consider. Auditing has become a very competitive activity, with tendering common and changes of auditors more frequent. Moreover, the leading firms are more diversified, auditing being regarded as a mature market and consultancy and advice being the expanding and profitable activities. Thus, there is pressure to please directors (often mistakenly referred to as clients, whereas it is the shareholders who elect the auditors) in order to avoid losing audits. If the auditor is to resist the directors and qualify the accounts, a specific rule book may provide a better prop than a vague injunction to provide a true and fair view. Moreover, the increasing threat of large negligence suits also creates a demand for specific rules which can provide a possible defence against negligence charges.

There have been important international pressures on accounting standard setting in recent years. Most obviously, the European Community (EC) directives have sought to improve the uniformity of accounting and auditing practice in the EC. Continental European accounting is generally more prescriptive and legalistic than that of the UK, so that its influence also is generally in the direction of more specific rule books (e.g. the company account formats introduced in the 1981 Companies Act). Another source of international influence is the increasing internationalisation of business, which has led to pressure for UK accounts to conform with those of other countries, both to reduce preparation costs and to facilitate their use in overseas financial markets. The pressure to conform with US practice is particularly strong, both because of the importance of the US economy and because the Financial Accounting Standards Board (FASB) and Securities and Exchange Commission (SEC) have tended to be international leaders in accounting standard-setting. The International Accounting Standards Committee (IASC) was originally a somewhat passive body which issued rather permissive standards, but it has recently started to be more pro-active, proposing to restrict the range of practices which it endorses. Since the IASC's standards are apparently strongly influenced by those of the USA, it seems likely that the IASC will increasingly become a vehicle for encouraging UK standards to become more in line with those of the USA.

The final source of pressure on ASC, public demand, is more nebulous but none the less real. For example, the adverse publicity attracted to the profession by the public accounting controversies of 1969 was influential in setting up the ASSC (Leach, 1981). More recently, Ian Griffiths' book *Creative Accounting* (1986) has been a best seller, and this must have provided some of the impetus behind ED42 (although the pressure has not yet been sufficient to force the development of a standard on the subject). The threat behind adverse publicity and public disapproval is, of course, that the government will intervene, as it has done recently in the securities markets through the Securities and Investments Board (SIB). In this context it is ironic to recall what Martin Gibbs (a stockbroker) wrote about the threat of government intervention, on the tenth anniversary of the ASC:

> We must continue the search for an effective voluntary system of control. The price of failure is likely to be the establishment of a government agency which would not only monitor the accounts of public companies but eventually extend its tentacles into the control of all aspects of the securities industry. (Gibbs, 1981)

### *Overseas Experience*

In view of the increasing internationalisation of accounting, it is important to consider what has happened elsewhere in the world, because it is unlikely that the UK (together with Ireland, which is also a partner in the ASC's work) will be able to pursue a completely independent course. However, even if this were not the case, it would be highly relevant to observe overseas experience as evidence of alternative possible scenarios for accounting standard setting.

One clear message emerges from overseas experience: financial accounting everywhere is subject to some form of regulation whether by statute or by private sector bodies. Thus, there is no extant example of the Chicago/Rochester ideal (e.g. Benston, 1981) of a regulation-free world in which accounting is regulated only by independent contracting between users and preparers. This suggests that there is a widespread demand for regulation, although there is no reason to suppose that any particular regulatory system currently in force is ideally suited to its purpose.

The other important message from international experience is that there is a variety of methods of standard setting currently in place, and the choice of methods seems to be contingent upon the economic, legal and political environment of the country concerned.

At the risk of being simplistic, it is possible to draw a distinction between the English-speaking world and the continental European tradition. In the former (the UK, USA, Australia, Canada, New Zealand and South Africa), there is a strong tradition of private-sector standard setting, albeit often (although not in the UK) with statutory backing, as in the SEC oversight of the FASB in the USA. This system is associated with active stock markets and emphasis on reporting relevant information to equity investors. The continental European tradition, on the other hand, emphasises the legalistic approach, the contents of accounts being prescribed by national accounting plans, company law or tax law. This system is prevalent amongst leading members of the EC, notably Germany and France (but not the Netherlands) and is also found in South America. It tends to be associated with economies which lay less stress on the stock market in financing and controlling companies. Thus, it can be hypothesised that private sector standard setting is associated with meeting shareholders' informational needs in an active capital market. Possibly this form of standard setting is seen as being more flexible and adaptable than the statutory approach.

## The Dearing Report

The Dearing Committee was appointed in November 1987 by the CCAB, the parent body of ASC, 'to review and make recommendations on the standard-setting process' (Dearing Report, p. 1) within specific terms of reference. It had sixteen members (including the current Chairman of ASC), drawn from a wide variety of relevant backgrounds (only four were accountants in public practice) plus a government observer and a secretary from the Bank of England. It received 45 written submissions and had informal discussions with interested parties (including visits to the USA). It reported in September 1988 (the date of the Foreword). The Report is thin and so, for the most part, is its evidence and the reasoning which it offers, but its proposals are carefully thought out and potentially momentous.

The main proposals for a new standard-setting structure are as follows:

(1) The current system whereby CCAB supervises the ASC should be replaced by one in which a new Financial Reporting Council (FRC) supervises a new Accounting Standards Board (ASB).

(2) The FRC would be independent of the accounting profession. The Chairman would be appointed jointly by the Governor of the Bank of England and the Secretary of State for Trade and Industry. The other members (20 in all) would be nominated by a wide range of interested groups (including accounting professional bodies). They would be senior people and the Council would meet rarely. It would set priorities for and oversee the work of the ASB.

(3) The ASB would consist of nine members, including a full-time Chairman and Technical Director, the remaining seven members being part-time but paid. They would be the core of the new standard-setting process, and would be supported by a larger technical secretariat than is the present ASC. It would issue standards on its own authority.

(4) The ASB should establish an Emerging Issues capability to provide prompt authoritative guidance on new problems.

(5) There should be a Review Panel 'to examine contentious departures from accounting standards by large companies' (p. 44). This should be modelled on the Panel on Takeovers and Mergers, with a pool of experienced part-time members and a Chairman who might be a QC.

(6) Legal backing for the process would be derived from three sources, which would involve new legislation:

   (i) Directors would be required to report on any deviations of their accounts from current standards.

   (ii) The current criminal offence which can (but rarely does) lead to prosecution of directors when the accounts do not give a true and fair view should be replaced by a new civil law statutory power, under which the courts can order the revision of accounts, following an application by the Secretary of State for Trade and Industry, the Review Panel or the Stock Exchange.

   (iii) There should be a general presumption in legal proceedings that accounting standards have the support of the courts, i.e. those who depart from accounting standards should bear the burden of proving that the departure was necessary in order to give a true and fair view.

(7) The cost of the new standard-setting system would be financed partly by a small levy (£1 is suggested) on the filing of company annual returns, by charging for the use of standards (which would be copyright) and publications,

> and by contributions from the Stock Exchange (from listing fees) and other private and public sector bodies which would benefit from the system. The contribution from the accounting profession, which currently supports the CCAB, would continue, but its dilution by contributions from other sources would mean that the new system was much less dependent on the accounting profession than is the present one.

### *Evaluation of the Dearing Proposals*

The main thrust of the Dearing Report is to propose a new administrative structure for accounting standard setting. This has three broad features. Firstly, it is intended that the ASB would be quicker and more decisive than the present ASC in producing standards, by virtue of the ASB's smaller size, ability to issue standards on its own authority, greater time commitment by members and greater technical support. Secondly, it is intended that ASB should be substantially more independent of the accounting profession than is the ASC (an offshoot of the CCAB). Thus, Dearing is proposing a move away from self-regulation by the accounting profession towards wider private-sector regulation, with a broad range of constituencies represented, and the government influence stronger (e.g. in the appointment of the Chairman of the FRC). Thirdly, the proposed system would have explicit legal backing, devised in such a manner as to overcome the ASC's present lack of authority whilst maintaining the ability of the ASB to set standards without the cumbersome process of detailed legislation.

In all of these respects, the Dearing Committee's recommendations are practical and sensible. It is possible to argue about details, e.g. the Department of Trade and Industry has questioned the amount of the levy on company annual returns, and the CCAB has suggested that only the Secretary of State should be responsible for (and bear the cost of) applying to the courts for an order to issue revised accounts. It is also possible to question whether the proposals go far enough (e.g. will the proposed distancing from the CCAB remove standard setting too far from the accounting profession, the one group which has shown a willingness to give practical support to the standard-setting process? The initial negative reaction of the Stock Exchange to the Dearing proposals is not a good omen). However, it seems likely that the Dearing proposals at least represent a step in the right direction. Their effectiveness is likely to depend upon the way in which they are carried out, the commitment and ability of those involved in the new bodies and the attitudes of their constituencies. A simple practical evaluation of the Dearing Report is that it is worth trying out and probably offers as good prospects as any alternative, if it is believed that accounting standards are necessary and that they should be set in the private sector.

That is not to say that the Dearing Report should be greeted with unqualified enthusiasm. The weakness of the Report is in its lack of evidence and lack of serious reasoning in support of its proposals. It is essentially a statement of the beliefs of a committee of 'the great and the good', relying on the *ex cathedra* authority of its eminent membership. Of course, those members have considerable experience and may well have pondered a great deal on the problems of standard setting, so that the Report, which is essentially a statement of conclusions, may be backed by more empirical evidence and analytical thought than is apparent from the text. Moreover, since the conclusions are essentially practical, the proof of the pudding will be in the eating, and *a priori* theorising or evidence of past events are not necessary preconditions for future practical success. Nevertheless, it would be reassuring to have more convincing evidence than the Committee chose to present, not least because the proposed new standard-setting structure would need a sense of direction and frame of reference, which it will not obtain from the Dearing Report. Whether the Solomons Report can fill this vacuum is an issue to be addressed later.

An obvious example of the Dearing Committee's thin empirical evidence is its statement that there is 'little evidence that companies are engaging in flagrant breaches of accounting standards' (p. 12). This is used to support the gradualist approach of the Committee, tightening up compliance in line with the best current international practice, but avoiding the possible inference that the ASC currently faces a crisis. In fact, the debate over price change accounting, resulting in the withdrawal of SSAP16 with no replacement, was most certainly a case of actual or threatened 'flagrant breaches of accounting standards', since non-compliance was the main motivation for ASC's retreat from the area. Equally, ASC, by its consensus nature, is bound to consider possible non-compliance before it issues a standard, so that the content of current standards (and the subjects on which standards have not yet been issued) reflects partially the threat of 'flagrant breaches'.

Theoretical argument is almost entirely lacking in the Dearing Report, pragmatism and expressions of opinion being the order of the day. This approach is at its weakest when the content of standards is considered: after all, the new structure will only be as successful as the standards which it issues, so we might hope for some view as to the content of these standards and how this relates to the Committee's view of their purpose. The Committee enjoins the new ASB to aim for 'quality and timeliness' and 'quality rather then quantity' (p. 18), but this is a somewhat empty injunction to pursue virtue, so long as 'quality' is not defined. Equally, the new standards are to reduce choice of method but at the same time accommodate the true and fair view. The conceptual framework is seen as something which would be desirable if it were feasible (although the reasons are not very clear: one of them seems to be that the Americans have one, so that the UK should follow) but is probably difficult to agree upon (hence, surely, are standards), so that it should be considered, but not pursued too hard.

This leaves a considerable vacuum, not only with respect to the aims and content of accounting standards, a subject which the Solomons Report addresses, but also with respect to the underlying rationale of the standard-setting process.

### *Some Questions Which Dearing Does Not Address*

The following questions are fundamental to the standard-setting process. The Dearing Report does not set out to answer them in a systematic way, although inevitably its somewhat pragmatic proposals provide implicit answers to them:

(1) Why do we need regulation of accounting?
(2) Why should such regulation be carried out in the private rather than the public sector?
(3) Within the private sector, what is the case for self-regulation by the accounting profession?
(4) Why is enforcement necessary and, therefore, what form should it take?
(5) What form should standards take: 'true and fair' statements of general principle or legalistic detailed prescription?

Clearly, the answers to these questions are interdependent, if we are to develop a coherent view of the standard-setting process. With regard to the fundamental question (1), the Committee's answer is the pragmatic one, that every other country seems to need standards. It would, however, be helpful to have a view as to the reasons for this and their particular relevance to the UK, i.e. an indication as to what failures in the market for accounting information justify regulation, contrary to the Chicago/Rochester view which assumes that the market is best suited to sorting out the costs and benefits of supplying information. One factor which might be important is the absence of a market capable of reconciling the needs of diverse shareholders and other users to provide a single, comparable, cost-effective information package (as suggested in the Solomons Report, p. 6). The Committee's answer to question (2) appears to be that standards should be set in the private sector. Presumably this has something to do with the greater flexibility of the private sector, although the Report does not make this clear. If this is the justification for private-sector standard setting, and if we accept the problem of diverse needs as being fundamental, then the body concerned should be capable of taking account of the needs and balancing the interests of all the parties concerned, which might suggest that self-reglation by accountants was too narrow (an answer to question (3)). On the other hand, it is important to guard against regulatory capture by interest groups. Dearing's proposed balance between the FRC (with its wide representation) and the ASB (technically proficient and independent but more narrow in membership) might be justified as an attempt to deal with these problems. Unfortunately, however, explicit reasoning of this type is absent from the Dearing Report and, as a result, its proposals are less convincing than they might be.

However, if we accept the pragmatic nature of the Report, the proposals individually do seem to provide a sensible and practical response to the pressures described earlier. There can be little doubt that similar pressures are leading to greater regulation in other countries and in other related markets in the UK, notably securities markets under the SIB's supervision. It is one of the ironies of the liberalisation of markets, such as has been attempted recently in the UK, that it often requires greater regulatory infrastructure (e.g. not only the SIB but also the regulatory agencies for privatised industries): the USA, for example, has historically had a much more market-oriented economy than that of the UK but has had much more formal regulation of the markets (notably by the SEC but also by many other state and federal agencies). The liberalising of markets within the EC also shows every sign of increasing public sector regulation. Thus, the Dearing proposals seem appropriate in the current historical and institutional context: bringing accounting standards out of the province of the accounting profession into a broader-based private-sector partnership which includes government representation and legal backing.

## The Solomons Report

The Dearing Report's ambivalence as to the appropriate form and content of accounting standards leads naturally to a consideration of the Solomons Report, *Guidelines for Financial Reporting Standards*. This was sponsored and published by the Research Board of ICAEW 'and addressed to the Accounting Standards Committee'. It therefore has less official status than the Dearing Report, and it is the work of one individual, Prof. Solomons, rather than a committee. It does, however, have some similarities in conception with the Dearing Report. Both reports were prepared in a relatively short time, both are designed to provide a framework for action to improve accounting standards (Dearing being concerned with the process of standard setting and Solomons with the content of the standards), and consequently both have a somewhat condensed style, with limited scope for discussing reasons and alternatives. Solomons is, not surprisingly, the better at spelling out his reasons, and many are elaborated in his well known book (Solomons, 1986). Nonetheless, there is a great deal of controversial material in his guidelines with which others might disagree, and there are points where his judgement has to be taken on trust, especially by those who have not read his other work or the wider academic literature to which it relates.

### *The Main Solomons Recommendations*

The Solomons Report starts from the assumption (Chapter 1, p. 6), that comparability is the central motivation for the regulation of accounting: 'Good accounting standards make *like* things look alike'. Closely related to this is the author's concept of representational faithfulness to the 'underlying economic phenomena' (p. 32). Starting off from this position, which is, of course, based upon assumptions which would not be shared by all academic or professional accountants, it is not surprising that the author reaches the conclusion (Chapter 6) that the model of accounting which should be adopted is based on current values (more specifically value to the business, VTB, of which Solomons (1966) was a pioneer, with general indexation of the capital to be maintained). This striking conclusion is, of course, consistent with the ASC's *Handbook on Accounting for Changing Prices* (ASC, 1986), but it will inevitably strike trepidation into the hearts of those who suffered the controversies over the withdrawal of PSSAP7, ED18, SSAP16 and its possible successor. It may therefore be safely anticipated that Solomons' courageous decision to extend his guidelines to the prescription of a current value measurement system will prove to be the most controversial of the fundamental aspects of the report.

However, there is much more to the Solomons guidelines than current value measurement. The broad thrust of the argument is as follows:

(1) The central purpose of financial reporting by a profit-seeking enterprise is to enable users of the information to assess the financial performance and position of the enterprise, to assess the performance of management, and to make decisions concerning their relationships with the enterprise. It is recognised that the four primary classes of users (investors, creditors, employers and suppliers or customers) will have different needs and interests, but it is claimed that these needs can be broadly met by general purpose financial statements which provide information relevant to two central matters: profitability and viability (Chapter 2).

(2) The two elements of financial statements are assets and liabilities (Chapter 3). Revenues, expenses, gains, losses, owners' equity and income are 'subelements'. This is a consequence of Solomons' view that the balance sheet is the fundamental accounting statement and that income is a subordinate concept, resulting from changes in the owners' equity (assets *less* liabilities) adjusted for introductions (new issues) and withdrawals (dividends). Thus, he believes that the accounts should be articulated, the profit and loss statement being consistent with the balance sheet and measuring what, in the USA, would be called 'comprehensive income', i.e. all gains and losses. He is willing to segregate revenues from gains and expenses from losses, in order to isolate the effect of the entity's principal operations (revenues and expenses). Assets are defined as 'resources or rights incontestably controlled by an entity at the accounting date that are expected to yield it future benefits' and liabilities are defined as the mirror image of this.

(3) The qualitative characteristics of accounting information are grouped under two headings, relevance and reliability (Chapter 4). Under the reliability heading, Solomons includes representational faithfulness, which 'requires that there should be substantial correspondence between the captions and quantities depicted in statements and the underlying economic phenomena that are being represented' (p. 32). There is also discussion of the trade-off between certain characteristics, such as relevance and verifiability, of how uncertainty might be depicted, and of prudence, which is found to be 'incompatible with the notions of representational faithfulness and consistency' (p. 41).

(4) Recognition in the financial statements (as opposed to mere disclosure by way of note) should depend on three factors: conformity to the definition of an asset or liability (or subelements derived from them), reasonable certainty of verification and measurement, and materiality of the amount (Chapter 5, p. 43).

(5) Measurement is inseparably linked with recognition (p. 43), and the preferred model of measurement (Chapter 6) is current value, based on Value to the Business (VTB), and with real terms financial capital maintenance (i.e. money capital adjusted by a general price level index) as the basis for assessing income or gains in a period. This 'real terms' system is illustrated (p. 56) by a pro forma profit and loss account which calculates current cost operating profit and proceeds, through adjustments for real holding gains and losses, to

derive a real income figure as the 'bottom line', although the reader has already been warned (p. 27) that there is a danger in concentrating on the bottom line rather than on the components of income.

(6) An Appendix (pp. 62–70) discusses the application of the Guidelines to five important topics in financial reporting (deferred taxes, pensions, financial commitments, goodwill, and the time value of money).

In a brief conclusion (pp. 60–1) Solomons justifies the need for his own Guidelines, rather than recent proposals by other bodies (FASB, IASC, and professional bodies in Canada, Australia and Scotland) on six grounds: The Guidelines refer specifically to 'the ***British*** accounting scene'; the primary use is seen as 'the assessment of enterprise and managerial performance'; 'The balance sheet is regarded as the primary financial statement'; 'great importance is attached to representational faithfulness', 'the ubiquity of uncertainty... is given due emphasis', and 'the need to move from the present HCA model is argued strongly'.

*Critique of the Solomons Guidelines*

An appropriate point of departure for assessing Solomons' Guidelines is his own claims for them, summarised in the preceding paragraph. Few would argue that a document addressed to the ASC should not refer to the British accounting scene, although it may be disputable whether the British scene differs greatly from, for example, that in Canada or the USA insofar as the desirable fundamental properties of accounting reports are concerned. Indeed, international pressures for harmonisation may make it desirable to find an internationally acceptable solution to British problems. Equally, few would argue with the central role accorded in the Guidelines to the assessment of enterprise and managerial performance, although the Guidelines are not unique in this. The FASB conceptual framework, for example, encompasses this objective, although it may not be so sharply focussed. This leaves us with four distinctive and more controversial claims to originality: the primacy of the balance sheet, the emphasis on representational faithfulness, the advocacy of the 'real terms' model of measurement and the treatment of uncertainty. The first three are closely related, and the latter is a distinct and less controversial issue, although one which raises some difficulties which are worthy of discussion.

The issue of the primacy of the balance sheet, and its relationship to the 'comprehensive income' approach (income as change in net worth) have already been mentioned. This is a basic *assumption* made by Solomons and it is possible to disagree with it. Clearly, the logic of double entry bookkeeping does lead us to the articulation of accounts (income as change in net worth) unless we introduce reserve accounting (enabling changes in net worth to by-pass the income statement). However, reserve accounting is widely practised, possibly in some cases to the detriment of users of accounts, but perhaps in other cases to improve the informational content of the income statement. Macdonald (1975), for example, has made the case for using different measurement conventions for the balance sheet and the income statement if the two are to perform useful distinct roles (one as a measure of income, the other as a measure of wealth), and more recently similar ideas have been proposed by authors such as Lee (1979) and Thomas (1979) in the context of cash flow (rather than income) reporting. Equally, a similar thought could be said to underlie the concept of current cost operating profit, which may explain Solomons' apparent hostility to it. Current cost operating profit, based upon the concept of maintaining operating capacity (which Solomons discusses as 'too nebulous a concept', p. 55) attempts to give an indication of the income generated, in current prices, by the firm's activities. Holding gains and losses are regulated 'below the line' to reserves, on the ground that they are not relevant to a continuing business which is committed to maintaining its operating capability.

This is not to say that Solomons' assumption as to the primacy of the balance sheet is inappropriate. He could have assembled powerful theoretical arguments in its favour, e.g. the Edwards, Kay and Mayer (1987) demonstration that 'real terms' accounts, such as Solomons proposes, can provide rate of return measures which are good proxies for economic rates of return. This demonstration relies on the articulation of accounts, which allows changes in balance sheet values to enter into total profits or gains (the numerator of the rate of return). However, it is clear that there are tenable alternative views (e.g. those which support current cost operating profit as a central performance measure), and an academic critic is bound to point out that these are not seriously discussed, although perhaps the potential audience of the Solomons Report craves simplicity (even when it is unattainable) and would be confused by such complications.

This brings us to the second, and closely related, issue: representational faithfulness. Solomons is already well known for his adherence to the view that accountants should eschew the political approach of adapting their information to appease interest groups, and should rather pursue the 'map-making' approach of portraying economic reality. Unfortunately, even maps do not portray some central geographical reality but rather provide selected information designed to meet particular uses (e.g. political maps, relief maps, geological maps etc.). Moreover, even the selected information which they do portray can be subjective and controversial, most obviously in political maps, when the national or political proclivities of the preparer are inclined to affect the location of boundaries. The same is, unfortunately, true of the underlying economic reality portrayed by accounts, including Solomons' fundamental 'elements' (assets and liabilities) and 'subelements' (such as owners' equaity and income). The latter concept plays a key role in Solomons' scheme of things, e.g. as portrayed in the pro forma income statement on p. 56 of the Guidelines. It would be inappropriate for the present author to criticise this proposal, since it is entirely consistent with his own (e.g. Tweedie and Whittington, 1985). However, it is necessary to question whether its justification lies in a one-for-one mapping of economic reality, or whether its 'representational faithfulness' is based on a more subtle, multi-dimensional and approximate form of representation. Solomons himself warns us (p. 27) of 'the danger from paying too much attention to the bottom line'. Elsewhere (p. 69) he suggests that goodwill is too subjective to be measured, so that the balance sheet cannot fully represent owners' equity. Thus, he seems to concede that the interpretation of accounts is a matter of building up a subjective picture based upon different items of information, some of which will be elements or subelements of his system, but others of which (such as knowledge of the market in which the firm operates) will be outside it. If this is his view, it seems a little harsh to dismiss the current cost operating maintenance concept entirely, because it may have potential use in building up the total picture in some circumstances, and, indeed, it does feature as a component of his pro forma income statement, despite his harsh words about the concept of operating capability. Equally, it might be felt that his adherence to value to the business (VTB) as the valuation base implies too single-minded a view of economic reality: the alternative cases for net realisable value (NRV), replacement cost and multi-column reporting have all been made eloquently by others and do not receive adequate consideration in the Guidelines, despite brief reference to the recent ICAS research publication, *Making Corporate Reports Valuable* (1988), which favours NRV.

The issue of the nature of the underlying economic phenomena which accounts are trying to represent leads us to the discussion of the third issue, Solomons' advocacy of real terms accounting. Although his dismissal of alternative current value systems may be cursory, his critique of historical cost accounting under conditions of changing prices is entirely convincing, as is his advocacy of *some* method of reflecting current prices in accounts. It would be unfortunate if, in debating whether the Solomons proposals are ideal or best approximations to users' information needs, we lost sight of the more important point, that, for decision making purposes, it seems likely that prices ruling at the accounting date will be more relevant than prices established in earlier periods, i.e. historical cost (HC).

However, although we may agree with the greater relevance of a system such as the real terms approach supported by the Guidelines, it is still possible to question the wisdom of extending the Guidelines to recommending a specific measurement base for accounts. Neither the FASB nor the IASC have been so adventurous in their conceptual frameworks. One reason for this is, of course, the extreme difficulty of obtaining general acceptance of any valuation basis other than HC, particularly in the aftermath of the widespread collapse of price-change accounting experiments in countries throughout the English-speaking world. Solomons' defence is that he is producing Guidelines which ASC should follow 'if it were free to go its own way' (p. 7). This is a most respectable intellectual position, but unfortunately it is likely to inhibit the possibility of the Guidelines being accepted by the ASC, as long as it remains in its present embattled position.

The fourth issue which arose from Solomons' claims to originality was the way in which he deals with uncertainty. This is certainly an important issue for accountants, and one which has been inadequately considered previously, so that he performs a useful service in putting the matter firmly on the agenda. Whether he deals adequately with the matter is another question. Even at the crucial stage of defining the basic elements, in the discussion of liabilities (p. 22), we have the distinction between a '*possibility*' and a '*probability*', the former to be disclosed in a note, and the latter to be part of the financial statements. Since both 'possibility' and 'probability' amount to assigning a subjective probability to the event, presumably the distinction rests on the level of subjective probability which is assumed (e.g. a 'possibility' might be something which is accorded a probability of less than 0.5), but this is not made clear. The same problem reappears in the general discussion of recognition (p. 28) when we are told that an asset such as a sweepstake ticket 'would not generally gain admission to a balance sheet because the promise of economic benefit is too uncertain'. This statement is appropriately hedged ('generally') but it leaves us in a state of uncertainty almost as great as that of the holder of the sweepstake ticket. For example, suppose a whole portfolio of sweepstake tickets were held. Presumably, we should then look at the uncertainty of the returns of the group: if the firm held all of the tickets in the sweepstake, there would be no uncertainty at all, and the tickets would qualify as an asset, just as they would qualify as a liability if the firm were the promoter of the sweepstake. However, once we concede that we have to consider each asset as part of a portfolio, there is no obvious reason why we should relate its risk only to that of assets of the same type, so that it might strictly be necessary to evaluate each asset (and liability) in relation to all of the other assets (and liabilities) of the firm.

It would be unreasonable to expect the brief Guidelines to solve all of these problems, and, as has already been conceded, it is appropriate that the Guidelines should draw attention to the problem of uncertainty. However, it is also apparent that accounting standards based on the Guidelines could potentially lack consistency with one another, given the lack of clear guidance as to when 'possibility' becomes 'probability'. This is less important than it might be, because the issue is merely whether the item subject to uncertainty appears in the main accounts or is reported by way of note. This does, however, draw attention once again to Solomons' possibly excessive emphasis on his two basic 'elements' and the importance of their giving a faithful representation of the underlying economic phenomena. Those economic phenomena which are very uncertain, but nonetheless real and potentially very important, will not be included in the rigorous structure of elements and subelements. It is not, therefore, possible to claim that this structure alone is adequate for a representationally faithful reporting system. Presumably, its justification is that it gives that sub-set of relevant information which can be stated with reasonable certainty. A 'devil's advocate' for historical cost might argue that the HC of assets, liabilities and completed transactions is all that can be stated with reasonable certainty. Given the nebulous nature of 'reasonable certainty', it is difficult to refute this argument logically.

This raises a wider issue concerning the Solomons framework. Ultimately, it is not derived by a process of rigorous logical deduction from a set of explicit axioms. Rather, it is based on judgment and its logical content is of a looser kind: its proposals are consistent with its assumptions (e.g. about the uses of accounts) but are not the only possible proposals which could be so. Thus, it is quite possible to accept the assumptions and intentions of the Guidelines but to propose an alternative system. The Guidelines must therefore ultimately rely for their acceptance on their intuitive appeal as much as on their internal logic.

It is also the case that the Guidelines would not remove all uncertainty about how particular problems should be dealt with. Solomons makes this clear in his introductory chapter (p. 7), and, perhaps unwittingly, he underlines it in his Appendix, 'Illustrative Material on Recognition and Measurement' (pp. 62–70), which contains some potentially controversial examples of how his Guidelines might be applied to specific problems. For example, his first illustration is a discussion of deferred taxes. This concludes that the full provision method (as currently practised in the USA) is preferable to partial provision (which is current UK practice). This conclusion is based upon the assumption that a 'timing difference... initially gives rise to a liability' (p. 62). This is certainly not the strict legal position (the liability is contingent upon the company continuing to make a taxable profit and on the precise form of the future tax regime) and there is a considerable continuing debate on the subject (a useful summary of the earlier debate is Beresford *et al.*, 1983). Solomons justifies his assumption by appeal to 'widespread though not unanimous agreement'. If we are to rely on widespread agreement to determine standards, the proposed guidelines can hardly be said to fulfil a useful role in changing the present situation.

## Conclusion

Both the Dearing Report and the Solomons Guidelines are responses to the current pressures on financial reporting which were described earlier. Both therefore aim to be practical documents, intended to be comprehensible to and acceptable by a wide constituency (including the type of robust, common-sense critic characterised by a distinguished former President of ICAS as 'the small practitioner in Wick'). It may therefore have been unfair to have subjected them to academic criticism, on the ground that their recommendations are not supported by the type of evidence which would justify the award of a PhD. Equally, it would be wrong to fall into the trap of expecting the degree of originality expected in a PhD thesis, and for this reason, comparisons with earlier reports of a similar nature have been avoided, despite the obvious pedigree of the present reports, stemming, for example, from the Wheat Report (on standard setting) and the Trueblood Report (on the objectives of company reports) in the USA and *The Corporate Report* in the UK (all of which appeared in the early 1970s).

However, there is substance in the academic criticisms made earlier, because they impinge potentially on the practical effectiveness of the proposals. In the case of the Dearing Report, it is possible to live with inadequate evidence provided that the proposals work. In the case of greater independence from the accounting profession and greater legal backing, the proposals do hold the possibility of working, in the sense that they might be more effective than the current ASC. However, a crucial gap in the proposals is the lack of a clear statement of guidance as to what type of standards the new ASB is supposed to produce. We have already seen that, on the form and content of standards and the role of a conceptual framework, the Dearing Report is ambivalent, and it seems curious to design a system in such detail without a clear specification of the product.

The Solomons Report does potentially fill some of the gaps left by the Dearing Report. Its objectives are admirable and it has many good features (a message which may have been obscured by the earlier critical discussion). It has two broad weaknesses. Firstly, it tends to provoke unnecessary controversy by its emphasis on representational faithfulness and a particular current value system, rather than by admitting more clearly (i) that representational faithfulness involves approximations, (ii) that the preparation and interpretation of accounting information are inevitably subjective processes (although we wish to achieve as much consistency as possible), and (iii) that a variety of valuation systems have some merit, but that for the sake of simplicity and consistency, VTB seems to be a sensible base to choose. Secondly, by stepping into the minefield of valuation, Solomons has prejudiced the practical possibility that his guidelines will be followed in the immediate future. Although this is a weakness from a practical point of view, it is a strength from a conceptual standpoint, because his guidelines make clear that it is extremely difficult, if not impossible, to deal adequately with recognition without considering measurement. Moreover, the current state of accounting standards provides an eloquent testimony to the problems which can arise from not having a consistent policy on valuation.

The ultimate test of the Dearing and Solomons Reports will be their practical effect. This implies two stages: acceptance and successful implementation. Current signs (as of July 1989) are that the Dearing Report has found favour with the government, and will receive some support, in the form of amendments to the Companies Bill. It is therefore likely to pass the first part of the test. The Solomons Report has been received kindly but not enthusiastically by ASC, which has welcomed the IASC's simpler and more limited conceptual framework, which does not address the valuation problem. Thus, the Solomons proposals may not even pass the first stage of the test. However, their author can console himself with the thought that the ASC will probably take the modest but desirable step of accepting the IASC document partly as a defensive measure against the more radical Solomons proposals, which are also on the table. Equally, he can be assured that, in the longer term, the issue of choosing a systematic measurement model must also inevitably be re-opened, if the Dearing proposals are successfully implemented and the ASB tries to put flesh on Dearing's somewhat imprecise exhortations to produce better standards than we have at present.

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# Textbook Formulae and UK Taxation: Modigliani and Miller Revisited

**D. J. Ashton***

**Abstract**—One of the less satisfactory features in the education of UK students of corporate finance is the presentation of formulae developed within the context of the US system of taxation. In this paper, the standard formulae of corporate finance are reworked with the context of the UK system of corporate and personal taxes.

## I. Introduction

One of the less satisfactory features in the education of UK students of corporate finance, is the unquestioning reliance on analysis which was originally developed within the context of the US economy. All too frequently analytical models developed in the US are presented to UK students in an unmodified form. This occurs even where it is clear that the basic structure of the model is not appropriate to the UK economy. A particularly apposite case is in the discussion of Modigliani and Miller's theories of capital structure. While it could be argued that, because of the insights which they provide into the valuation of corporate earnings, the writings of Modigliani and Miller (MM) are worthy of presentation to students, the UK tax system is sufficiently different from the US system that their relevance to the practice of UK financial management is non-existent. Even where authors of UK texts discuss how UK taxation modifies the MM conclusions, their analysis is frequently incomplete and inconsistent. Such is the pervasiveness of the role played by taxation in both the capital structure and the dividend decision, that modification is necessary to nearly all the standard textbook formulae used in finance.

While it would be invidious to cite any particular textbook, it would also be wrong to ignore the many contributions made by UK academics to the subject of financial theory and UK taxation. Thus, Kent and Theobald (1980), Fung and Theobald (1984), King (1974, 1977), McDonald (1981), Stapleton and Burke (1977), Franks and Broyles (1979), Pointon (1981, 1986) and Rutterford (1988) have all analysed aspects of the UK imputation system of taxation. Many of these authors have been strongly influenced by the pioneering work of King (1974, 1977) and concentrated on the impact of the UK tax system on financial policy.

In this paper, the contributions of Modigliani and Miller together (MM, 1958, 1961, 1963) and separately (Miller, 1977), Modigliani (1982), to the capital structure and dividend policy debate are reworked under current UK tax legislation. Conditions for the existence and size of any tax advantage to corporate debt are identified. Formulae which relate the cost of equity of capital and the weighted average cost of capital of geared and ungeared companies are then developed which accord with the view taken on the tax advantage of debt. While not all of the formulae developed in this paper are original, and some can be found in the papers and texts already cited, the particular contribution of this paper is the presentation of the formulae within an internally consistent framework.

## II. The tax advantage to debt

The valuation of a firm can be derived by consideration of the total flows after personal taxes to the providers of capital. These flows are represented by the left hand side of Equation (1), where the right hand side of the equation is obtained from a consideration of the cash flows into and out of the firm.

$$D(1-\bar{t}_e)+r(1-\bar{t}_d)L = X(1-\bar{t}_e) + r[(1-\bar{t}_d)-(1-T)(1-\bar{t}_e)]L \quad (1)$$

The tax rates $\bar{t}_e$ and $\bar{t}_d$ are weighted averages of the marginal rates of taxation on net dividend income and gross debt income respectively, where the weights are inversely related to the investor's risk aversion (Brennan, 1970; Stapleton and Burke, 1977). $T$ is the corporate tax rate and $D$ is the expected net dividend. $L$ denotes the level of debt financing where debt is assumed to be selling at par.

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*The author is professor of finance and accounting at the University of Bristol. He thanks J. Cadle and P. Moizer for their comments on earlier drafts of this paper.

If we replicate the approach adopted by Modigliani and Miller, the present value of these flows can be thought of as the present value of risky after tax operating cash flows ($X$) associated with an identical all equity financed firm, plus the present value of the 'contractual' obligations associated with debt ($L$). Capitalising these (after-tax) debt flows at an (after-tax) rate on debt, then we get the familiar 'textbook' expression for the tax advantage to debt, $A$ as in Equation (2).

$$A = \left[ 1 - \frac{(1-T)(1-\bar{t}_e)}{(1-\bar{t}_d)} \right] L \qquad (2)$$

This last equation is of limited practical use unless some value can be imposed on the relative sizes of $\bar{t}_e$ and $\bar{t}_d$. The most common assumption is that the average of the marginal tax rates ($\bar{t}_m$) on gross dividend income and on debt are equal. This would certainly be true if all investors, who hold equity also hold tradeable debt and vice versa, though we shall postpone the discussion of the circumstances under which this is true until later. Such a condition implies that

$$1 - \bar{t}_d = 1 - \bar{t}_m = (1-t_s)(1-\bar{t}_e) \qquad (3)$$

where $t_s$ is the basic rate of personal tax.

With the assumption of equality of average marginal tax rates on debt interest and gross dividend income, this gives the value of the tax advantage to £1 of permanent debt as $(T-t_s)/(1-t_s)$. It follows that, at current (1989) tax rates for $T$ of 0.35 and for $t_s$ of 0.25, there is a relatively small but positive tax advantage to issuing corporate debt of about 13% of its market value. Nevertheless, in the absence of bankruptcy or other agency costs, this tax advantage would give rise to the familiar and unacceptable corner solution of 100% debt financing. However, it is perhaps worth observing that the tax advantage to debt is considerably less under the (UK) imputation system than it is under the (US) classical system. This reduced tax advantage to debt arises because under an imputation system, the gross dividend can be offset against the firm's corporation tax liability (King, 1974).This has implications for any analysis which attempts to model the capital structure decision purely as an equilibrium trade-off between the tax advantage to debt and the expected costs of financial distress. The smaller tax advantage to debt in the UK would predict, in general, lower levels of debt in the UK than in the US.

One of the problems with debt having a positive tax value, and certainly a positive tax value the size of that originally predicted by MM, is that it predicts levels of corporate debt far in excess of those observed. In an attempt to explain this observation, Miller (1977) re-examined the tax advantages of corporate debt, in an economy with both corporate and personal taxes. He concluded that with a progressive personal tax system which treats equity returns more favourably than debt interest payments, an equilibrium level of debt in the economy as a whole existed, such that the tax advantage of corporate debt disappeared.

Miller's analysis concentrates on the supply of debt (i.e. firms expand their borrowing until there is no tax advantage from the issue of further debt). In contrast, the analysis by Auerbach and King (1983) concentrates on the demand for debt and equity, whereby individuals adjust their portfolios to take advantage of any relative tax advantages between debt and equity. They showed that in a CAPM world, the Miller equilibrium could only exist where there were restrictions on the extent to which individuals can indulge in such personal tax arbitrage. In the UK, the restrictions necessary for the Auerbach-King Equilibrium are an inherent feature of the tax system. Interest on personal loans are not allowable against investment income and this restricts the availability of personal tax shields and places a lower bound on investment in debt. In addition, institutional constraints restrict the ability of investors to sustain permanently short positions in equity and long positions in debt. This places an upper bound on the holding of debt. A consequence of such restrictions is a segmentation of the market, with some individuals preferring equity for tax reasons and some individuals preferring debt. With some degree of specialisation in equity or debt, there is no longer any reason why the average of the marginal tax rates on income of those who hold equity should be the same as those who hold debt. A general equilibrium model emerges in which investors adjust their portfolios and firms their capital structure until any tax advantage of debt disappears. From Equation (2) this occurs where

$$1 - \bar{t}_d = (1-T)(1-\bar{t}_e) = (1-T)(1-\bar{t}_m)/(1-t_s) \qquad (4)$$

Equation (4) establishes a different relationship between $\bar{t}_d$ and $\bar{t}_e$ from that of Equation (3). Perhaps, not surprisingly, all the standard formulae of finance are dependent upon whether Equation (3) or Equation (4) is taken as the correct relationship between the tax rates on gross dividend and debt income. Clearly we need to try to identify the circumstances when either the conditions as expressed in Equation (3) or the conditions as expressed in Equation (4) prevail. Since these conditions involve the aggregate tax rates on risk free debt and on risky equity, the most appropriate (if not the only) vehicle with which to carry out this analysis is the CAPM. Prior to this though, we need to establish the existence of the rate $\bar{t}_e$.

Now the return $r_j$ on the equity of firm $j$, before personal taxes, is the sum of its net dividend yield $d_j$ plus capital growth $g_j$. It follows that the after personal tax return $r_j^a$ can be written in the form of Equation (5).

$$r_j^a = d_j \frac{(1-\bar{t}_m)}{(1-t_s)} + g_j(1-\bar{t}_g) \qquad (5)$$

Hence, in general, it is difficult to associate a single rate $\bar{t}_e$ with the tax on equity returns unless the condition as expressed in Equation (6) holds.

$$\frac{1-\bar{t}_m}{1-t_s} = 1-\bar{t}_g \qquad (6)$$

This condition is the condition for the tax irrelevancy of dividend policy. Whether dividend policy can be tax irrelevant under the current UK system is the subject of the next section.

## III. The tax advantage to dividends

Under the imputation of the tax system, a shareholder for whom the marginal tax rate $t_m \leqslant t_s + (1-t_s)t_g$ would prefer dividend income, while a shareholder for whom the inequality is reversed would prefer returns on equity in the form of capital gains. However, in contrast to the US Tax System, in the UK the difficulty is in the identification of groups of individuals who purely for tax purposes would seek capital gains as opposed to income on equity investment. For many Institutional Investors, tax rates are such that they should have a preference for dividends. Thus, for pension funds, neither dividends nor capital gains are taxed and $t_m = t_g = 0$. This would imply a tax advantage to dividends. For life assurance companies $t_m = t_s$ and $t_g > 0$. This again implies a preference for dividend income. Investment trusts and unit trusts with $t_m = t_s$ and $t_g = 0$ are effectively neutral with respect to returns in the form of either dividends or capital gains. In this case the preference or otherwise for income over capital gains depends on the tax position of subscribers to such funds.

For individual shareholders, the 1988 Finance Act set $t_m = t_g$ and again this should lead to a preference for dividends. However, in the case of individual shareholders, there are additional circumstances which militate in favour of capital gain. Firstly, there is an annual threshold below which no capital gains tax is paid. For many individuals, this reduces, or even eliminates, the tax paid on capital gains. Secondly, indexation of capital gains also reduces the number of individuals who actually pay capital gains tax, since capital gains tax is only paid on real as opposed to nominal gains. For those individuals who pay tax at the higher rate (i.e. $t_m > t_s$) and who do not pay capital gains tax (i.e. $t_g = 0$), there is tax advantage in returns in the form of capital gains. Hence, it would appear that for some individuals, if not for institutions, there might remain a tax preference for capital gains.

If tax were the only determinant of dividend policy, then investors could either collectively change the dividend policy of the firm or individually could adjust their own shareholdings to maximize their after tax incomes. A consequence of this would be that in equilibrium, any tax advantage or disadvantage associated with dividend policy would be eliminated, and the condition as expressed in Equation (6) would hold.[1]

## IV. Textbook formulae with a tax advantage to debt

We are now in a position to explore how the US formulae associated with the writings of MM on capital structure (MM, 1958, 1963) and the development by Lintner (1965), Sharp (1964) and Mossin (1966) in the CAPM, translate under the UK system of taxation, when there is a tax advantage to debt of $(T-t_s)/(1-t_s)$ per £ permanent debt. The first of these formulae is an after-tax form of the CAPM.

Let us consider the risk return trade-offs in a mean variance world for a group of shareholders with representative tax rates of $\bar{t}_m$, $\bar{t}_g$ and $\bar{t}_d$. This group of individuals would adjust their portfolios and expectations to conform with (an after tax form of) the capital asset pricing model (see Brennan (1970), Elton and Gruber (1983)).

This gives us a CAPM in the form of Equation (7):

$$d_j \frac{(1-\bar{t}_m)}{(1-t_s)} + g_j(1-\bar{t}_g) - r_f(1-\bar{t}_d) = \beta_j\left[d_m \frac{(1-\bar{t}_m)}{(1-t_s)} + g_m(1-\bar{t}_g) - r_f(1-\bar{t}_d)\right] \qquad (7)$$

In the derivation of Equation (7), the assumption has been made that dividends are certain and that the riskless asset is an interest only security. If we assume that dividends are tax irrelevant, then we can invoke Equation (6). On then dividing Equation (7) by $(1-\bar{t}_m)/(1-t_s)$ we get:

$$E(r_j) - r_f(1-t_s)\frac{(1-\bar{t}_d)}{(1-\bar{t}_m)} = \beta_j\left[E(r_m) - r_f(1-t_s)\frac{(1-\bar{t}_d)}{(1-\bar{t}_m)}\right] \qquad (8)$$

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[1] We really need the assumption of the tax irrelevancy of dividend policy to make progress. The problem is that, by convention, we attempt to value corporate cash flows after corporation tax, when clearly the value assigned to these flows by the market is net of all taxes, both corporate and personal. It is, therefore, only possible to value corporate cash flows if a simple relation exists between the discount rate for net of corporate and that for net of personal cash flows. No such simple relationship exists if the pattern of cash disbursements (i.e. dividend policy) affects value. The work of King (1973) extended by Poterba and Summers (1984) suggests that currently there is a net positive tax advantage to dividends, though it is relatively small. In the remaining discussion we shall ignore this small tax advantage and assume neutrality for the reason stated above.

Now if there are no restrictions on taking long or short positions in equity or debt, and if borrowings are allowable against tax, then in equilibrium every investor holds both equity and debt (Appleyard (1978), Diacogiannis (1987)). Under such circumstances, it follows that $\bar{t}_m = \bar{t}_d$ and we get a CAPM in the form of Equation (9):

$$E(r_j) - r_f(1 - t_s) = \beta_j(E(r_m) - r_f(1 - t_s)) \quad (9)$$

This is an after tax form of the CAPM consistent with a tax advantage to debt of $(T - t_s)/(1 - t_s)$ for each £1 of debt raised. While it was generated by considering the subset of investors who are shareholders in a particular firm, since the after-tax form of the CAPM derived is not dependent on the aggregate tax position of this group of investors, it should be clear that it is a general model which applies to the market as a whole. It is also worth noting that an implication of Equation (9) is that the post corporation tax cash flows associated with riskless debt ($\beta = 0$) should be capitalised at a rate of $r_f(1 - t_s)$. For example, issuing £1 of permanent (riskless) debt results in an initial inflow of $+1$ followed by a constant outflow stream of $-r_f(1 - T)$ in perpetuity. Discounting these flows at $r_f(1 - t_s)$ gives a tax advantage of £1 of perpetual debt of $T - t_s/1 - t_s$ as before.[2]

It follows that the value of the levered firm $V_L$ and the unlevered firm $V_u$ are related by

$$V_L = V_u + \left(\frac{T - t_s}{1 - t_s}\right)L \quad (10)$$

This is the equivalent of MM (1963), proposition I under the UK imputation tax system (see also Franks and Broyles, 1979). If we adopt as our definition[3] of cost of capital $\rho_L$ as in Equation (11)

$$\rho_L = \frac{X}{V_L} \quad (11)$$

then the relationship between the cost of capital of the geared ($\rho_L$) and ungeared company ($\rho_u = X/V_u$) follows as in Equation (12).

$$\rho_L = \rho_u\left(1 - \left(\frac{T - t_s}{1 - t_s}\right)\frac{L}{V_L}\right) \quad (12)$$

This is the 'MM cost of capital' adjusted for the imputation tax system. The equality of this cost of capital with the traditional textbook form for the weighted average cost of capital enables the cost of equity capital of the geared ($K_e^L$) and ungeared ($K_e^u$) company to be related[4] as in Equation (13).

$$K_e^L = K_e^u + [K_e^u - r(1 - t_s)]\left[\frac{1 - T}{1 - t_s}\right]\frac{L}{S} \quad (13)$$

If we make the 'normal' textbook assumption and treat debt as riskless (Schnabel, 1983), then an immediate corollary of the above is that the geared beta ($\beta_L$) and ungeared beta ($\beta_u$) are related by

$$\beta_L = \beta_u\left[1 + \frac{L}{S}\left(\frac{1 - T}{1 - t_s}\right)\right] \quad (14)$$

All the above formulae can readily be derived from their American versions by replacing $T$ by $T - t_s/1 - t_s$ and the risk free rate $r_f$ by $r_f(1 - t_s)$.

## V. Formulae where there is no tax advantage to debt

Section IV which in effect replicates the original MM analysis, but under a UK tax system, can therefore be plausibly thought of as providing an upper bound to the tax advantage of debt. In contrast, this section provides an analysis of the situation when the tax advantage to debt is at its lower bound of zero. It will be remembered that in Section II it was argued that if we made the quite plausible assumption that individuals adjusted their portfolios until this maximised the total value of their holding then, given restrictions on permanent long or short positions in equity or debt, the market would segment. We would be left with individuals who specialised in debt of tax reasons and other individuals who specialised in equity.

For instance, from consideration of equilibrium portfolios, it is relatively easy to show that individuals for whom

$$\frac{E(r_m)(1 - \bar{t}_e) - r_f(1 - \bar{t}_d)}{\sigma_m^2(1 - \bar{t}_e)^2} > \lambda,$$

where $\lambda$ denotes the individual's risk aversion, would normally borrow funds and take a long position in equity. If such borrowing for equity investment were not available or the interest on such borrowing could not be offset against tax, then such individuals would hold no debt and hold only equity. A new equilibrium could emerge in which investors were neutral, as far as taxation was concerned, to both dividend policy and to capital structure.

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[2] It should be emphasised that $r_f(1 - t_s)$ is a somewhat artificial discount rate, in as much as it is not a rate available in the market. The market rate is $r_f(1 - \bar{t}_d)$ and this is the rate at which the market values the riskless cash flows (as represented by the last term in Equation (1)) associated with debt. Under the assumptions which we made, the rate $r_f(1 - t_s)$ ensures a correct valuation of cash flows at the corporate level.

[3] This definition of the cost of capital is different from that used by Franks and Broyles (1979, p. 311). The definition in Equation (11) is the conventional one, in that the resulting cost of capital can be used to value project cash flows after corporation tax but before ACT considerations. The Franks and Broyles definition would imply that we discount project cash flows net of mainstream corporation tax, though this definition is not consistent with their earlier treatment of the valuation of project cash flows.

[4] Again, this formula differs from that derived by Franks and Broyles (1979, p. 316). Their formula would be correct if the cost of equity were computed from the gross dividend yield plus capital growth. This, however, is not consistent with their earlier discussion of the return computed from the CAPM.

If we proceed with arguments as in the previous section, then again the tax neutrality with respect to dividend policy would lead us to a CAPM as in Equation (8). However, in this case, the additional condition for the tax neutrality with respect to capital structure (Equation (4)), implies a CAPM of the form:

$$E(r_j) - r_f(1 - T) = \beta_j[E(r_j) - r_f(1 - T)] \qquad (15)$$

This is a 'tax-neutral' CAPM, where the excess return is measured relative to the risk free rate adjusted for corporation tax. An identical result is derived by Ashton (1989) by applying a general equilibrium approach to security selection in a mean variance world which also incorporates the principles of the UK tax system. It follows from this formula that the appropriate discount[5] rate, for the post corporation tax flows associated with riskless debt is $r_f(1\text{-}T)$ (Ruback, 1986). Such a discount rate, when applied to the post corporation tax cash associated with debt, gives no tax advantage to debt.

Since the tax advantage to debt is identically zero, we can conclude that the weighted average cost of capital and the value of the firm are constant and independent of the capital structure. This is nothing more than the Miller (1977) result applied to the UK tax system, although, since no reference is made to the rate of ACT, such a formula would apply equally well to the US system. The formulae for 'geared' equity and the geared Beta formula follow trivially, where again Equation (17) requires the assumption of riskless debt:

$$K_e^L = K_e^u + \frac{L}{S}\,(K_e^u - r(1 - T)) \qquad (16)$$

$$\beta_L = \beta_u\left[1 + \frac{L}{S}\right] \qquad (17)$$

The above formulae can be conveniently remembered by replacing $r$ by $r(1 - T)$ in the traditional textbook formulae developed in the absence of corporation tax. Alternatively, they can be remembered by setting $T = t_s$ in the formulae derived in Section IV.

## VI. Conclusion

In this paper, we have reconstructed the arguments of Modigliani and Miller (1958, 1963) and Miller (1977) within the context of the UK tax system. It has been argued that if there is a tax advantage to debt it is likely to be much smaller than the traditonal MM value and is likely to be no more than 13% of the market value of permanent debt. Even then, the detailed structure of the UK tax system is such that investors are able to adjust their portfolios such that any tax advantage to debt disappears.

These observations, that a neo-classical analysis of the tax system leads to neutrality with respect to the firm's financial policy, frees the analysis from the 'strait-jacket' imposed by the original MM writings. As long as the tax advantage to debt was supposedly as large as 35–50% of the face value of debt, it was difficult to rationalise the behaviour of managers. Thus, the absence of tax advantages to debt opens-up/re-opens the question as to what are the economic forces that determine the company's debt decision.

No attempt has been made in this paper to answer this much more general question. Rather, the aim of this paper has been to answer the much simpler question of whether or how the UK imputation tax system affects traditional textbook formulae.

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[5] Again the caveat of footnote 2 applies.

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# Rationality and Politics in Pit Closure Decisions

T. J. Brignall and L. Fitzgerald*

**Abstract**—This paper considers whether pit closure decisions can be justified solely on financial grounds. It examines a variety of approaches drawn from accounting and economics, which may be arranged in a crude 'hierarchy of sophistication'. The paper's conclusion is that the pit closure problem is far more complex than has generally been portrayed to the public, and that satisfactory solutions to it cannot be derived solely from within traditional accounting or economic approaches. The paper is a pedagogic exercise which exposes the limitations and partiality of accounting and finance by applying them to a particular, well-documented case. The paper argues for the inclusion of externalities and social welfare considerations in a planning framework for British Coal guided by Schumacher's principle of conservation.

## Introduction

It is now four years since the end of the miners' strike. This seems an appropriate distance from which to view events, particularly the accounting issues previously raised, notably in *Accountancy* (Berry et al, 1985). The strike raised many other issues, such as the right to manage, the legality of mass picketing, and law and order generally. From an accounting point of view, however, it focused upon the correct criterion for pit closure, the definition of an 'uneconomic' pit. The National Coal Board (NCB), the government and the media usually equated this in public with a loss-making pit. The National Union of Mineworkers (NUM), however, proposed that no pit should be closed until its mineable reserves were exhausted, and argued for government action to expand demand for coal. This led to an inevitable conflict.

This article considers whether pit closures can be justified solely on financial grounds. We conclude that they cannot, but not simply on the grounds of the undoubted limitations and partiality of mainstream accounting, which have been exposed by many radical critiques (e.g. Brignall, 1988; Burchell et al, 1980; Chua, 1986; Glyn, 1984; Hopper and Powell, 1985; Laughlin, 1985; Laughlin and Lowe, 1986). Instead, our critique focuses on the problems of accounting for non-renewable resources and the appropriate form of organisation—public or private—for exploiting them. As such, it is not a 'conventional' exercise in social accounting either (see Puxty, 1986, for some cautionary remarks on these). We chose pit closure for our study of the limitations of accounting and finance because it is a controversial and well-documented ongoing case, with important consequences for public policy towards nationalised and privatised industries, energy policy, and the conservation of finite energy resources.

Our article is driven by two arguments. The first is the 'principle of conservation', so ably articulated by the late Ernst Schumacher, formerly the NCB's chief economic adviser. This principle argues that conventional economic and accounting analyses based on manufacturing processes are not applicable to the non-renewable, finite reserves of energy resources such as coal. The basic reason for this is that such analyses require meaningful market prices, but these are not available for coal. Until we have guaranteed infinite alternative sources of energy, and we know their costs, we simply do not know what our coal reserves are worth. In this case market prices, dominated by the cheapest worldwide marginal price, are a poor guide for making closure decisions, especially as it is virtually impossible to reopen pits once they have been closed. If we treat energy as *the* limiting resource in society, the correct criterion for closing a coal mine is that the energy expended in recovering its remaining reserves will be greater than their energy content. This means that, *once a mine has been opened*, it usually should be worked until its reserves are exhausted. This is not to say that society may not have time preferences as to when to use our coal reserves: we might argue that it would be better to conserve our national resources at present and import cheaper coal from abroad for so long as such supplies are available. But such a stance would only have an impact on the rates of opening up new UK reserves and working existing ones; it would not justify the *closure* of faces, seams and mines currently being worked.

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*Lecturers in accounting and finance, School of Industrial and Business Studies, University of Warwick. The authors would like to thank Rob Bryer, Trevor Hopper, two anonymous referees and participants at a research workshop at the University of Warwick for their comments on earlier drafts of this paper.

Our second argument concerns the fact of nationalisation. As Schumacher said, 'An important reason for the nationalisation of the coal industry was the thought that private profit-seeking and competition are incompatible with the rational and systematic exploitation of a non-renewable resource' (Schumacher, 1983, p. 144). In consequence, the current profit-dominated policy of 'best seams first' is wrong, and could be argued to illustrate that some politicians have even shorter time-horizons than private corporations. However, the gaps between the goals of nationalisation and the practice are largely beyond the scope of this paper (but see Brignall, 1988), as is the nationalisation vs. privatisation debate.

There is no one group of decison makers with sole responsibility for coal mining. We therefore put forward a general model for making pit closure decisions, and then consider its implications for decision makers at different levels. This will involve an examination of a variety of approaches to this problem drawn from accounting and economics, which may be conveniently arranged in a 'hierarchy'. We do this because accounting and finance are widely considered to be 'the language of business' and economics is the wider framework in which they are placed. In addition, accounting and economic arguments were widely used by both sides during the dispute.

Our general model (including the hierarchy of analyses) is in three parts. First come the conventional accounting analyses drawn from financial accounting, management accounting and financial management. This would usually suffice to answer closure questions in a private-sector profit-making company whose boundaries are conventionally defined. Those boundaries would, at least in theory, be breached in the event of significant externalities, and proponents of nationalisation should be particularly willing to allow this. In such a case, as with British Coal, accounting analyses would no longer suffice: to find an answer to pit closure decisions conventional welfare economics would favour the use of cost-benefit analysis, but other techniques such as data envelopment analysis, binary comparisons or mixed scanning might also be resorted to. Finally, in the case of finite energy resources such as coal one might propose, as we shall, that even cost-benefit analysis is insufficient, and that Schumacher's principle of conservation should dominate the decision and hence our hierarchy. Thus the point of our general model is to show that the limitations of conventional accounting mean that it cannot answer the question of how to make pit closures, nor can economics or other decision analysis techniques, and that Schumacher gives the answer.

The purposes of the paper are thus threefold:

(1) to examine the relationship between accounting profitability and economic value, whilst considering the boundary of the firm and the role of the market in deciding which activities should be pursued;

(2) to analyse management's strategic policy making in the light of Schumacher's conservation principle and in the context of the nationalisation/privatisation debate;

(3) to enlighten our views of history. Many of the arguments in the paper were used, whether implicitly or explicitly, by the participants in the dispute and were discussed, with varying levels of accuracy, in the media. The issue of pit closures is controversial, but such subjects always generate more debate; like inflation accounting, pit closures will always be with us.

The paper proceeds in four sections. In the first section we examine the framework under which the industry was nationalised and the immediate background to the year-long miners' strike. The second section sets out the event that triggered the strike and our hierarchical model of accounting analyses. The third section contains our general model for making pit closure decisions, and the techniques of mainstream accounting and finance laid out in the second section are then tested against this. The fourth section considers how the consequences of the fact of nationalisation and Schumacher's principle of conservation might be implemented, using several models drawn from modern decision theory. Our brief conclusions follow.

## The historical background

The UK coal industry was nationalised in 1947 after decades of industrial strife and under-investment. The Coal Industry Nationalisation Act of 1946 stated that the NCB's board was charged with the duties of:

(a) working and getting coal in Great Britain to the exclusion . . . of any other person;
(b) securing the efficient development of the coal mining industry;
(c) making supplies of coal available . . . as may seem to them best calculated to further the *public interest in all respects* . . . (our emphasis).

The Act also set the financial objective of ensuring 'that the revenues of the Board shall not be less than sufficient for meeting all their outgoings properly chargeable to revenue account on an average of good and bad years'. This later became better known as a requirement to break-even after depreciation and interest payments on debt capital, taking one year with another. The intention of the Act was thus to give the Board monopolistic powers whilst preventing it from earning monopoly profits (for some caveats as to the likely effectiveness of this system, see Brignall, 1988).

### *What Went Wrong?*

The NCB's sales of coal in the late 1970s and early 1980s were lower than anticipated in 1974's expansionary *Plan For Coal* (NCB) for many reasons. Amongst these were:

(1) reduced demand from the British Steel Corporation (BSC), in the late 1970s because of its falling share of the home market, and in the 1980s because of

(2) energy saving, both within BSC and elsewhere in manufacturing industry, and

(3) the closure of 'surplus' UK manufacturing capacity following the second oil shock in 1979. These factors reduced the demand for electricity, and hence for coal, whether as a direct or indirect source of energy.

In 1981/82 the UK consumed just 117 million tonnes (mt) of coal, 73% of it by the Central Electricity Generating Board (CEGB). Production was outstripping sales, stocks building up from 28 mt. at the end of 1979/80 to 53 mt. at the end of 1982/83. This increase in stocks made it difficult for the NCB to stay within its External Financing Limit (EFL, an annually-set upper limit on the amount it can borrow), and encouraged the view that the NCB had surplus capacity at a time when it had 16 mtpa of new capacity recently brought into production and another 26 mtpa under construction, including the Selby 'super-pit'.

This stimulated government intervention. The Coal Industry Act of 1983 stated that '. . . in the Government's view the justification for coal production, like that for any other business, lies in the ability of those engaged in it to earn a satisfactory return on capital while competing in the marketplace'. The NCB was instructed to reduce its costs in real terms, to break even by March 1986, and to align its capacity to its share of the energy market. Whether this was intended or not, possible means for achieving these objectives were contained in the June 1983 report of an investigation 'on the efficiency and costs in the development, production and supply of coal by the NCB' carried out by the Monopolies and Mergers Commission (Cmnd 8920). Their report defined 141 of the 198 pits then operating as unprofitable, and implied that the NCB could eliminate its surplus capacity by closing its high-cost, loss-making pits. Proposals to close high-cost pits were not new. As Prosser (1986) points out, 'Select Committees called for a new plan which would clearly have involved closure of the highest-cost pits, and most notably the Monopolies and Mergers Commission recommended closure of about 10% of capacity in addition to the closures due to the effect of new investment (HC 135, 1982/83; HL 80, 1983/84; HC 296, 1983/84; Cmnd 8920).' (p. 143).

Some 90% of the NCB's total losses in 1981/82 were incurred in just 30 pits, and it has been compellingly argued that '. . . the variations in pit performance closely correspond to the allocation of investment' (O'Donnell, 1988, p. 73). If we ignore for the moment the possibility of transforming a pit's performance by allocating investment funds to it, it has been argued (O'Donnell, 1985) that potential candidates for closure could be tentatively identified from the NCB's routine responsibility accounting document, the F23, a pro-forma for which is included as appendix 3.9 in the Monopolies and Mergers Commission's report. The F23 is a historical cost profit and loss account prepared for each pit, and the Commission cautioned that care should be taken in interpreting its results, even over an extended period (e.g. five years).

However, the emphasis of the preceding section on demand-side explanations should not obscure the importance of the supply side. It is not the case that the NCB has simply failed to contract in line with falling demand (O'Donnell, 1988). As hinted earlier, the pit closure problems of British Coal have been compounded by other factors, notably their decision to expand the proportion of total output produced by (a) open-cast mining, and (b) very large, capital-intensive deep mines, such as that at Selby (Hopper and Nisse, 1985, p. 5, and *The Financial Times*, 13 January 1987). In doing this the predispositions of British Coal's managers have been reinforced by the prospective high profits that might accrue to such a strategy, which would fit in with the current UK Government's desire eventually to privatise the profitable rump of the industry. As a step to further this aim British Coal intended to break even in 1988/89, but Sir Robert Haslam, British Coal's chairman, has recently said that it would take 'a near miracle to achieve it' and given a warning of 'further urgent cost-cutting measures, including the reduction of even more high-cost coalmining capacity' (*The Financial Times*, 14 February 1989). Industry insiders have predicted that 'nearly 20,000 men would be offered redundancy and more collieries would shut over the following 18 months . . . To speed the process, redundancy rates have been improved to include an attractive leaving fee of £7500 per miner' (FT, *op. cit.*). It is interesting to note that the industry is not being offered a financial reconstruction at this time, to relieve it of its £440m p.a. interest charges.

This likely eventual privatisation should also be seen in a wider, indeed worldwide, context, as suggested by Rutledge and Wright (1985). They highlight the increased worldwide involvement in coal production by such oil companies as BP and Shell, and their likely interest in the privatisation of British Coal. As they point out, 'Oil company mining projects are now integrating wholly new coal mining areas into the world market' (p. 303). Such companies might be expected to favour liberalised approaches to the UK coal market, such as that advocated by Robinson (1987), in which imports might play a greater role than hitherto. But Rutledge and Wright (1985), considering recent work on the international costs of mining and transporting coal, together with the inherent volatility of exchange rates, conclude that an enhanced role for imports in the supply of coal to the British market is risky, both in terms of likely future costs and security of supply. It is also likely that if some or all of British Coal were to be acquired by BP or Shell, their attitude towards *UK* coal production (as opposed to coal production elsewhere) would be likely to be more akin to that of any multinational producer of a range of commodity products, which can be sourced from many parts of the world. (There are many types and grades of coal, with widely different prices and different burn characteristics but, within each type or grade, one country's supplies are as good as another's: all that will differ is the price.) In adverse circumstances the attitude of such a multinational company could affect UK employment, with balance of payments and other effects of the type demonstrated by Rowthorn and Ward (1979).

Whatever the importance of such worldwide developments in the future, it is also important to note their influence on the NCB in the recent past. The expansion of worldwide coal production in the 1970s and 1980s, much of it open-cast, in third world countries, financed by oil majors, and a consequent overproduction when the world economic recession arrived in 1979/80, '... [was] a major factor in stimulating the NCB's financial crisis, mainly through their general effect upon price negotiations between the NCB and CEGB. To this extent, they must be regarded as important predetermining factors leading to the miners' strike' (Rutledge and Wright, 1985, p. 323). Between 1979 and 1983 the price of coal sold by British Coal to the CEGB was cut by £2.25/tonne, and the latest 'agreement' has cut it by a further £3.80, with annual revenue implications of some £500m (O'Donnell, 1988, p. 73).

There is a further, UK, element to the supply-side input to the pit closure problem, highlighted by Burns *et al.* (1985). Automation and more intensive shift working (e.g. six day working) are being applied to boost productivity. Both of these processes increase the output from the super-pits and reduce the amount of coal needed from the other pits. This forms part of the background to the 1984 miners' strike over the closure of so-called 'uneconomic' pits. As a result, 'pits in the 'peripheral' areas face closure and suffer from a lack of investment, whereas miners in the 'central' coalfield face job losses through automation and are experiencing adverse changes in work organisation' (Burns *et al.*, 1985, p. 93). These changes are partly due to '... the high fixed costs of the central area high-investment pits. Unless high output is maintained, the operating costs of the super pits make them unprofitable' (Winterton and Winterton, para. 3.8, Memorandum 60 to the House of Commons Select Committee on Energy, session 1985/86, February 1986). Similar closures of peripheral, surplus capacity to make way for large new steelworks with high break-even points were observed in British Steel in the 1970s and early 1980s (Bryer *et al.*, 1982, section four).

These changes in technology and organisation, crucially involving a tightening of central control, have resulted from a whole-hearted adoption of systems theory by the NCB's Operational Research Executive (ORE) and its Central Planning Unit (CPU), the objectives being to change the NCB from an inflexible, rule-following Weberian bureaucracy into a flexible, 'rational actor'. This would enable the integration of '... market models with models of the NCB's production as a basis for planning ... [in which] political considerations also play a part ... [but] with most of the 'human relations' aspects playing a minor role ... ' (Burns *et al.*, 1985, p. 94). The formal outputs of this process of systems engineering are embodied in MINOS (mine operating system), which is 'a highly centralised, hierarchically organised system of remote control and monitoring in mines' (Burns *et al.*, 1985, p. 98). The suitability of such a planning and control system to British Coal's environment will be considered later.

## Cortonwood and the start of the strike

In March 1984 the announcement of the proposed closure of Cortonwood Colliery in the South Yorkshire area of the NCB led to the year-long strike by the NUM. It is therefore useful to consider this case at this point, before moving to our general model, as it may cause the reader to reflect on the appropriateness of some arguments for closure used by British Coal, and others' initial responses to them.

Cortonwood's F23 for 1981/82 showed an historical cost loss of £6.20 per tonne (pt) of coal produced. The historical cost accounting model is a steady-state model which, if prepared on a financial capital maintenance basis, using accurate and unbiased estimates, measures the long-run distributable cash surplus of a business, on the twin assumptions that the period's transactions are replicated and there is no inflation (May, 1976; Bryer & Steele, 1989). Given the unusually uncertain environment which faces the NCB, such a forecasting model is inappropriate, which is why the Monopolies and Mergers Commission were cautious about the use of the F23 for making decisions.

In any event, a pit's F23 contains both fixed and variable costs and allocated overheads from the Areas and Head Office. Berry *et al.* (1985) therefore carried out what they called a 'contribution analysis' on Cortonwood's results to show that, rather than the reported loss, Cortonwood was generating a positive contribution of (depending on one's assumptions) between 88p and £5.45 pt. The normal short term management accounting decision rule would be to continue an operation which is making a positive contribution to fixed costs, even if not to profits, whilst taking action to improve matters in the long run.

In fact, what Berry *et al.* had done was more akin to an attempt to operationalise Shillinglaw's (1963) concept of attributable cost, which he defined as '... the cost per unit that could be avoided, on the average, if a product or function were discontinued entirely without changing the supporting structure'. Attributable cost is the sum of short-run variable costs plus divisible fixed costs plus indivisible traceable costs. Berry *et al.*'s analysis separated the cash costs that might be avoided by closing Cortonwood from those which would be incurred anyway, and on this basis they argued that it was not obvious that Cortonwood (and, by implication, many other pits like it) should be closed.

### *A Hierarchy of Analyses*

There are many techniques of analysis within accounting and economics which might be applied to the problem of whether/how to make pit closures. In making our selection we believe we have achieved a fair and balanced representation. We are also mindful of our objective, which is to reiterate Schumacher's point that conventional economic and accounting analyses do not apply to finite energy resources. This contradicts present practice.

Seventy-six pits have closed since the end of the strike and 93,000 miners have left the industry (*Financial Times*, 2nd February, 1988). The public 'justification' for these closure decisions, some of which were not agreed by the independent Colliery Review Procedure set up after the strike, was usually that they were making losses. There may be rational political, industrial relations, technological or other reasons for closing pits, but we intend to examine a set of mainstream accounting and finance approaches, drawn from the three main areas of accounting and finance: financial accounting, management accounting and financial management. We start with the most obvious (and least appropriate) and move on up our 'hierarchy' of sophistication.

(1) Historical cost profit/(loss). (This has been covered above.)

(2) The financial controls over nationalised industries, especially the proposals concerning a particular version of CCA in the Byatt Report. These two levels are drawn from financial accounting.

(3) Contribution analysis.

(4) Attributable cost.

Categories (3) and (4) are management accounting techniques.

(5) Investment analysis: net present value (NPV) versus a modified Black-Scholes option pricing model (OPM). These are probably the two best approaches currently available within financial management.

In our opinion, these five categories effectively exhaust the possible contributions of mainstream accounting and finance to any resolution of the pit closure problem. We shall show that, even on their own terms, they do not offer an adequate approach to making pit closure decisions. But in arriving at our general model we also believe the following aspects of UK Energy Policy to be crucially relevant:

> (a) Coal as a primary source of energy in competition with electricity, oil and gas. We believe that this 'competition' between different sources of non-renewable energy should be planned in the national interest by the government.
>
> (b) Coal versus nuclear power as a form of electricity generation. We believe that the NCB and the CEGB are so closely interlinked that it is extremely difficult to appraise the performance of either in isolation. The imminent privatisation of electricity, while it may increase the pressure on British Coal to reduce prices, will not change the existing interdependent relationship between the two industries.

In an attempt to improve on the tools available within mainstream accounting and finance we will briefly examine the economists' technique of social cost-benefit analysis, including employment and environmental/ecological aspects, as a possible way of improving pit closure decisions. Finally, we will present some other possible ways of implementing the Schumacher argument.

## A general model

A general model for making pit closure decisions should encompass externalities and the principle of conservation. The reason for including the second of these is explained by Schumacher, who emphasised that, unlike a normal production plant such as, say, a steelworks, it is difficult and expensive to close down or 'mothball' a pit (although it may be possible to slow down the rate of working, or the opening up of new coal faces and seams). To have any chance of re-opening a temporarily closed pit, its roof props have to be maintained and replaced and its workings and roadways continually pumped dry. Once closed without maintenance, it is virtually impossible to re-open (and certainly very expensive to do so) as it floods and the seams close up and cannot be reached: any coal left in a mine at the time of closure is effectively lost forever. In a world which does not have access to infinitely renewable sources of energy, we are likely to want all there is at some time. The present policy of loading the super pits first in a drive for profits is simply a policy of 'best seams first'. It is wasteful because it violates the principle of conservation: it causes the abandonment and sterilisation of unexhausted seams. It also implies that the present generation is content to benefit at the expense of later generations. As Schumacher said, '... these irreversible decisions have to be taken and they have to make sense, not just now, but also twenty, thirty or forty years hence' (1983, p. 86).

The overriding reason for including externalities is that British Coal is a nationalised industry. As Schumacher pointed out, '.... private ownership of the means of production is severely limited in its freedom of choice of objectives, because it is compelled to be profit seeking, and tends to take a narrow and selfish view of things' (1974, p. 253). In contrast, public ownership can embrace any objectives and need not make decisions solely on the basis of profit or loss according to a narrow definition of the firm.

Within this nationalised framework there are some detailed arguments. Firstly, Andrew Glyn demonstrated, at the time of the strike, that the cost to the nation of supporting unemployed miners exceeds the subsidy needed to keep them in employment within the NCB (NUM, 1984). A crucial caveat, of course, is for how long they would stay out of work: Glyn assumed that their unemployment would be permanent. Making different assumptions, Minford & Kung and Metcalfe & Davies arrived at different conclusions (see Cooper & Hopper, 1988).

Secondly, the conventional economic argument for not subsidising a loss-making industry is that it is better to close it down and so release the resources tied up in it for more productive (and profitable) use elsewhere. However, the capital assets used in a mine are use-specific. Other than transferring them to another of its mines, the opportunity cost of such released assets to the NCB or to the Nation would be negligible as they would have a low net realisable value, particularly after allowing for the costs that would be incurred in getting them up to the surface again. In practice the major released resource would be labour. At a time of high unemployment the release of a large number of miners with non-transferable skills located in isolated communities of (typically) high unemployment merely adds to the burdens on the taxpayer. At best, all that is achieved is a switch from one part of the public purse to another. For this reason, and given that the NCB is a nationalised industry, we advocate that the normal boundary of the firm be drawn a little wider and that pit closure decisions should not be decided solely on commercial grounds.

Under the conventional Morrisonian 'arm's length' doctrine, day-to-day business matters in nationalised industries have been the responsibility of their boards of directors, whilst social aspects of their policies have been the province of the sponsoring minister. The traditional separation of powers and responsibilities has enabled nationalised industry boards to ignore the social consequences of their planning decisions by saying that these are the responsibility of the sponsoring minister. Ministerial response to pleas about social effects such as closures has usually been that they cannot interfere in the day-to-day planning and other decisions of boards. The end result has been a lack of consideration of social aspects of decisions (Foster, 1971, p. 30). As a consequence, nationalised industries have acted pretty much as though they were private sector companies. In particular, in the 1980s they have been major 'unemployers' (Bryer *et al.*, 1984). This reality, so different from the original visions of many proponents of nationalisation, has weakened resistance to privatisation, which has been shown to have benefited a few at the expense of many (e.g. Tomlinson, 1986).

This has been no less true in the case of coal. It has been decision makers at government level, with the assistance of civil servants, who have decided that pits should close, and a government body, the Monopolies and Mergers Commission, which (whether deliberately or not) identified possible means. But it was left to British Coal's managers at area level, subject to Board approval in the light of the CPU's model and government policy, to decide which individual pits should close. It has been argued by one set of observers that this was done in practice in one area (North Derbyshire) in the light of '... workable capacity supported by rudimentary contribution analysis' (Hopper *et al.*, in Knights and Willmott, 1986).

Glyn's cost-benefit analysis of employment effects concluded that none of the pits proposed for closure should have been closed. His analysis excludes the second and third externalities, environmental/ecological effects and the benefits of indigenous coal production. As regards environmental considerations, one should recall that coal mining is a dirty, unhealthy and dangerous occupation which causes expensive subsidence and unsightly and hazardous air and land pollution. Its rival, nuclear power, does not score well on environmental counts either. The hazards of nuclear generation are now well known, but there are still unanswered questions about nuclear waste disposal and the costs and hazards of de-commissioning nuclear plants. When a nuclear programme goes ahead, as envisaged in the government's electricity privatisation plans, more re-processing plants will be needed. The capital and operating costs of such plants should be added to the nuclear generating costs when comparing the 'nuclear option' with coal. Similarly, the costs of de-commissioning nuclear plants should be estimated and added in to the equation. As regards the benefits of indigenous coal production, these are greater security of supply, additional UK employment and the possibility of price-related gains.

The foregoing has put our case for the inclusion of externalities and the conservation principle in our general model. To complete the model, we would argue that the size of the UK coal industry should be determined by answers to the following three questions:

(1) What are the UK's future energy needs? These will be affected by future economic growth, and in turn by industrial policy.

(2) What proportion of total UK energy demand should be supplied by coal?

These two questions are at the strategic level of UK energy policy as a whole, and are properly the province of the minister in consultation with his civil servants, relevant experts and the boards of coal-consuming industries and companies. We hope that a UK energy policy will be developed, for at the moment, 'in fact, Britain no more has an energy policy than it has a policy for the weather' (Ince, 1984, p. 185, quoted in Prosser, 1986, p. 119).

(3) What mix of types and size of coal mines should be utilised to meet the expected demand for coal? (Insofar as the mix could affect costs and hence potentially price and demand, (2) and (3) are linked. Indeed, it might be argued that (2) cannot be answered until (3) has been decided).

It is only with this last question that we arrive at the level of 'system adjustments', which is the level at which British Coal's pit and area managers currently become involved, under the supervison of the board. We believe that they should make incremental adjustments on the basis of attributable costs, and apply investment analysis when capacity falls below demand.

### *How Does the NCB Make Closure Decisions?*

The NCB has the ability to make closure decisions at two levels in its hierarchy: at area level and at the head office. An exposition of how the decisions were made *at the area level* was included in the October 1985 report by the group of independent accountants (Custis, Morpeth, Stamp and Tweedie), recruited by the NCB to comment on the findings of Berry *et al.* (1985). They concluded that the NCB at area level then appeared to look at five factors when considering a pit's closure:

(1) Mining technicalities, such as the reserves remaining, the prospects for installing more advanced technology, and any possibility of merging the pit under consideration with another one nearby, so sharing surface facilities.
(2) Market prospects, such as a desire to retain a loss-making pit in the short to medium term in order to serve a particular market, perhaps by blending the pit's output with that from another pit; or retention in the expectation of improved future prospects, through a rise in the real price of coal, for example.
(3) Financial prospects, such as an expected positive contribution; or future profits through investment or by increased shift or face working.
(4) Industrial relations issues, such as the desire to retain workers for transfer to new capacity when it comes on stream, or to avoid problems like compulsory redundancies.
(5) Other matters, in particular public relations aspects such as subsidence or opposition to open cast mining.

The accountants examined the cases of six pits which had recently been closed and compared them with eight which had been reprieved. For the six that closed, the overwhelming reason appeared to be mining difficulties. Of the eight that were retained, good financial prospects were envisaged for six, five were kept for mining reasons, seven for market-related reasons and four to avoid compulsory redundancies. Obviously, most were retained for more than one reason. The eight pits retained all made F23 losses between 1976/77 and 1983/84, and had higher losses per tonne in 1981/82 than Cortonwood. Apparently accounting losses are not seen by the NCB's area managers as either necessary or sufficient grounds for a pit's closure, but their presence will encourage an examination of a pit's viability. In the words of Professor Tweedie, 'All the F23, the colliery profit and loss account, is used for is simply as a tripwire' (oral evidence to the House of Commons Select Committee on Energy, Session 1985/86, para. 643).

The foregoing has explained how the NCB made closure decisions at the area level. At the NCB's *head office*, however, the Central Planning Unit (CPU) uses the MIS element of MINOS '...to construct scenarios based on the policy choices before management. So called "uneconomic pits" can be identified according to the criteria in force at any particular time, and the list can be revised at a moment's notice should different criteria be applied' (Burns *et al.*, 1985, p. 104). At the time of Hopper *et al.*'s investigation (1986) the CPU's model used marginal analysis.

The CPU's approach to systems engineering is open to several types of criticism:

(1) It centralises power and is causing pit closure decisions on financial grounds alone. We believe that this means that political considerations are dominating the closure process, and that traditional buffers at the area level, as observed by Custis *et al.*, have been swept aside. The bases for this belief are the large number of pit closures since the strike, which have been at a pace far surpassing anything seen before, implying a change in the criteria applied; the papers by Burns *et al.* (1985), O'Donnell (1985) and Rutledge & Wright (1985); the facts that many of these closures were opposed by the independent colliery review process set up after the strike, and that British Coal has refused to be bound by the decisions of the review process; and the findings of the public enquiry conducted by Cooper at Polkemmet Colliery in Scotland (see Cooper *et al.*, 1985). Finally, the recent Monopolies and Mergers Commission's report (HMSO, 1989) on British Coal noted that it had been '... surprised by a defensive attitude by BC to possible criticism of some aspects of its decisions and operations' (quoted in *The Financial Times*, 26th January 1989, p. 8).

(2) Another level of criticism of the NCB's decision making is prompted by Boland (1979), who argued that information system designers ignore the social processes and institutions in which the systems will be used. Information systems will affect the way in which managers perceive 'reality' and define problems. In consequence, what are needed are organic, collegial and decentralised information systems rather than mechanistic, centralised ones. However, the NCB's model assumes a passive user and a need for central, mechanistic control in order to try to 'optimise' results. This view is functionalist and objectivist, and has strong parallels with mainstream approaches to accounting. This conventional view '... tend[s] to result in conceptions of the organization as being in a static equilibrium, interacting with an environment which is effectively knowable, objectively verifiable and inconsequentially affected by the action of managers' (Boland, 1979, p. 261). None of these is applicable to the situation of the NCB. As a result, its planning system and accounting controls are inappropriate to the tasks it should face as a nationalised industry. The NCB is in a permanent state of disequilibrium because of the unforeseeable interactions of future demand, competing suppliers, geological difficulties, fluctuating prices and government policies. It therefore needs an information system which, in Boland's terms, is not only a 'model of' the social process, but a 'model for' its ongoing creation by all the social actors and institutions involved.

As Prosser (1986) put it, 'The implication is that a plan should be seen as part of an institutionalised learning process rather than an abstract and isolated set of intructions...' (p. 145).

In the opinion of Hopper *et al.* (1986, p. 120) '... no-one at area level mentioned or seemed to be aware of the [CPU's] strategic model or the detailed marginal analysis associated with it ...'. While this may seem surprising, it is consistent with a traditional, and natural, concern of production managers with production issues first and finance (e.g. 'rudimentary' contribution analysis) second. However, we are sure that this ignorance would not be found today. Ironically, we too would like to see knowledge of the CPU's model filter down to the pit and area levels. If we wish to reform the way in which candidates for closure are selected and appraised it would seem to us that it will not be sufficient simply to change the CPU's model to encompass externalities, social welfare considerations and Schumacher's conservation principle. There will have to be a closer coupling and exchange of information than hitherto between head office and the areas. This should be used to facilitate a change at area level from viewing pits as mere production/cost centres, to seeing them as investment centres run on not-for-profit principles.

### *Management Accounting*

Having outlined the NCB's approach at area and head office levels, let us now examine it using the tools of management accounting. In a run up to privatisation, with heavy pressure (e.g. via tightened EFLs and the investigation by the Monopolies and Mergers Commission) being put on the NCB's Board to make the enterprise profitable, it would be natural for them to want to maximise the contribution per tonne from every tonne of coal they can afford to extract. But the annually set EFL cash constraint on their borrowing powers, 'agreed' by negotiation with the Treasury and the Department of Energy, should also encourage them to look closely at the pits that offer the greatest potential cash savings from their closure.

The first of these two factors lends itself to a contribution approach, under which the pits (and pit faces) with the lowest variable costs per tonne are loaded with orders first, then the next lowest, and so on. This system can be observed in operation elsewhere in the nationalised sector, notably the CEGB and BSC. However, in both of those cases it is used to decide which elements of the existing system to *run*, and how intensively, not which should be closed. Marginal analysis of the type apparently used in the CPU's planning model should not be used to make strategic decisions about the amount and type of capacity that the

NCB should have. Its only use should be to make short-term, 'tactical' or operating decisions. The second (cash-saving) factor, on the other hand, should encourage the use of attributable cost to 'slim down' the system, to trim capacity to demand and enable the NCB to live within its shrunken EFL.

Obviously, the presence of more than one objective or constraint can lead to confusion if they pull in different directions. The underlying point here is a common accounting problem: in the short-term should British Coal's managers pay more attention to liquidity (in this case represented by EFL constraints, and implying the use of attributable cost to shrink the industry), or to profitability (implying the use of variable costs in choosing which mines and faces to work in the drive to break even)? In practice, in the 1980s the EFL has become the dominant control over nationalised industries (Prosser, 1986, p. 61), and it has been used before to force a 'loss-making' industry to contract. (See Bryer *et al.*, 1982, pp. 175–7, for an interesting parallel, also involving a delayed capital reconstruction and continued high interest payments in the interim).

The new, highly mechanised pits which are a cause of the capacity problem would, in general, be favoured by a system which loaded pits in ascending order of their variable costs per tonne, but they might look very vulnerable to an attributable/avoidable cash cost analysis. The reason for this is that their attributable costs will be high because of their high direct fixed costs. They should also include a cost of capital charge on their high capital expenditure, but in the older, less capital intensive pits such charges would be lower. Whether one would choose to make 'system adjustments' using variable costs (which seems, from Burns *et al.*, 1985, Custis *et al.*, 1985 and Hopper *et al.*, 1986, to be the NCB's approach) or attributable costs would probably depend on whether the binding short-term constraint was felt to be profit or the EFL. But it is important to note that the results would almost certainly differ, depending on which method one used.

### *Financial Accounting Controls, Economic Valuation and the Byatt Report*

The major financial controls over the nationalised industries are external financing limits (EFLs), required *ex ante* economic rates of return on the industries' investment programmes as a whole (RRRs), and *ex post* target accounting rates of return on net assets (TRRs). The Byatt Report (1986) proposes that the nationalised industries prepare CCA in such a form that the *ex ante* economic RRR can be easily reconciled with the *ex post* accounting TRR, while still being subject to the EFL constraint. The income stream from such 'clean surplus' current cost accounts may also be discounted to give an economic valuation of the firm (Peasnell, 1982; Bryer & Steele, 1989). (Clean surplus accounts have also been proposed recently by Edwards *et al.*, 1987 and Solomons, 1989). This proposed development of the financial control system will further elevate the role of profit in the NIs, and appears to be designed to further the government's privatisation plans for coal and electricity.

Long term planning is incompatible with EFLs set annually , particularly where the relationship between the EFL and planning is not made clear (e.g. Prosser, 1986, p. 117–8). Now that the PSBR is no longer of overriding concern, it might be better to set a framework of EFLs for, say, five years into the future. Until this is done the annual EFL will dominate any attempts to plan for the medium to longer term.

### *CCA and Management Accounting*

As is usually the case, a responsibility accounting control system like the F23 does not lend itself to either of the two decision techniques mentioned above, contribution analysis and attributable cost. Indeed, the F23 does not attempt to identify the relevant opportunity costs for pit closures, which are strategic questions. Nor are balance sheets prepared and examined at the pit level. These 'failings' on the part of the NCB's accounting system seem strange given that they include current cost accounts in their annual report. The use of CCA by the nationalised industries (and others) has been advocated for many years by the Treasury, as most recently advanced by the Byatt Report (1986). As a result of this seeming neglect of available information, the NCB does not appear routinely to consider their assets' opportunity costs, which will reflect the Board's strategy. Following Bonbright's (1937) framework, an asset's value to its owner may be its replacement cost, its net realisable value or its present value: whichever it is will be the basis shown in the current cost accounts. However, it is true that, in practice, the NCB's assets have a generally low opportunity cost which will often be irrelevant to its decision making.

### *Financial Management and Investment Analysis*

In the context of a constrained demand, decisions to expand capacity (strategic investment decisions) are directly linked to decisions to delete capacity (i.e. pit closures). The NCB appraises its new mine projects using NPV analysis with a real discount rate which aims to ensure that it meets the government-imposed real required rate of return of 5% on its investment programme as a whole. It has flexibility to raise or lower the rate for individual projects, to cater for varying risk, as it sees fit, subject to the agreement of its sponsoring ministry (the Department of Energy). Others before us (notably Cutler *et al.*, 1985) have argued that the rates used for its new mine projects are unrealistically low, and appear biased in favour of long-lived projects such as Selby, which had a planning horizon of 40 years.

It would appear that in the run up to privatisation the NCB is looking for more commercial rates of return from its prospective (and current) investments. This begs the question of whether recent investments were wise, on two counts: are they earning commercial returns, and were the pit closures they helped cause really necessary? It would be very ironic if some of these new pits were to be prematurely closed following privatisation. The recent Monopolies and Mergers Commission's report on British Coal's investment programme has cast doubt on the wisdom of the investment of £400m into the 'super-pit' at Asfordby in Leicestershire, for example. Another way of considering the first of these two concerns might be to examine the NCB's NPV case for Selby.

### *The NPV Case for Selby*

The NCB employs NPV analysis to make investment decisions. NPV analysis is conventionally considered to be the best framework for making such decisions, although it has its problems (see Brignall, 1988, pp. 10, 13 & 14), and some of these may be better handled by a rival technique, the Black and Scholes Option Pricing Model (OPM). With respect to the NCB, Hopper *et al.* (1986, p. 119) concluded that '... the manner in which an investment proposal was classified ... was regarded as a crucial factor in its approval ... and little concern was placed on producing a supporting financial statement, which was a somewhat *ex post* financial rationalisation (with cash flows etc. "estimated" so that the desired outcome was produced) ... almost no emphasis was placed on identifying, and financially evaluating, alternative investment proposals'. When this is juxtaposed with O'Donnell's claim (see p. 215 above) that there is a strong link between the allocation of investment funds and perceived performance, and hence a pit's survival, these NPV cases for new mining projects take on a new political significance.

The NCB's appraisal of the Selby pit envisaged a positive NPV of some £322m on an investment outlay of £1351m, using an 8% discount rate. Just raising the rate to 10% lowers the NPV to only £55m. At 12% the NPV is a negative £(169)m. Elementary sensitivity analysis on the assumed output level, holding the discount rate at the original 8% and everything else constant, shows that a 10% fall in output lowers the expected NPV to £190m, and a 20% fall to £13m. Any plausible 'scenario' or combination of assumptions shows that this planned addition of 10 mtpa. of capacity to a total NCB capacity of some 100 mpta. was based on 'knife-edge economics' (Cutler *et al.*, 1985). It may be the case that Selby would not have been an attractive investment for the private sector.

The point we are making here is not a criticism of NPV *per se*, but of its misuse. A more radical criticism is that the NCB do not include estimates of social costs and benefits in their projects' cash flows. However, we accept that this would be difficult, and it would be open to the same criticism that Schumacher made of cost-benefit analysis: '... it is a procedure by which the higher is reduced to the level of the lower and the priceless is given a price' (1974, p. 43). Cost-benefit is politically manipulable, as '... all one has to do is to impute suitable values to the immeasurable costs and benefits. The logical absurdity, however, is not the greatest fault of the undertaking: what is worse, and destructive of civilisation, is the pretence that everything has a price or, in other words, that money is the highest of all values' (Schumacher, 1974, p. 44).

### *The OPM*

It would seem to us that the classical present value framework, as used by British Coal, is very difficult to apply where future output is conditional on geological features, which will only be known with certainty as extraction takes place, and on future market conditions which cannot be known in advance and which two oil shocks in the 1970s showed to be highly volatile. Depending on the interaction of these two variables, output levels may be changed, or a mine be shut down or abandoned altogether, with resulting costs of closure, redundancy and attendant social misery.

However, optimal operating policies might more easily be determined by treating each mine as an 'option' on the coal within it, and by suitably adapting the Black-Scholes option pricing model (1973), which has received much attention in the financial theory literature in recent years (e.g. Brennan and Schwartz, 1985). This approach has problems, but in theory it might obviate the need to forecast the future spot price of coal, or to determine an appropriate risk-adjusted discount rate, which are central problems with the present value approach. Another advantage of the OPM is that it does not encourage a static, one-shot approach to investment decision making, but permits one explicitly to value management's operating flexibility to shut a mine temporarily and subsequently reopen it, or even abandon it. In contrast, abandonment value has received comparatively little attention in the NPV literature (but see Robichek and Van Horne, 1967 and Joy, 1976). However, such analyses could be carried out using the OPM at any time during the life of a mine. Ignoring these operating options could lead to an underestimate of the value of a mine, and hence lead to sub-optimal decision making.

The OPM may not only more easily indicate the optimal abandonment time for a mine, it is also based on a more appropriate underlying analogy. Conventional present value analysis is based on a method first used to value a riskless bond with known, regular coupon payments. The application of this valuation model to risky investment in real assets, such as coal mines, necessitates an adjustment to the discount rate to reflect the risk. The OPM, however, may be applied (albeit with some difficulties) in such a way as to avoid the need to estimate an appropriate discount rate, and it is based on a valuation model designed to cope with a contingent claim on a risky underlying asset, an ordinary share.

Just as a 'call' option on a share gives its holder the right to acquire shares at a fixed exercise price, which will only be exercised if the stock market price subsequently rises above the fixed exercise price, so ownership of a coal mine confers the right to acquire the output of the mine at a 'fixed' exercise price equal to the variable costs of extraction. This option will only be exercised if the extraction costs are below the market price of the coal. The value of the mine will depend upon:

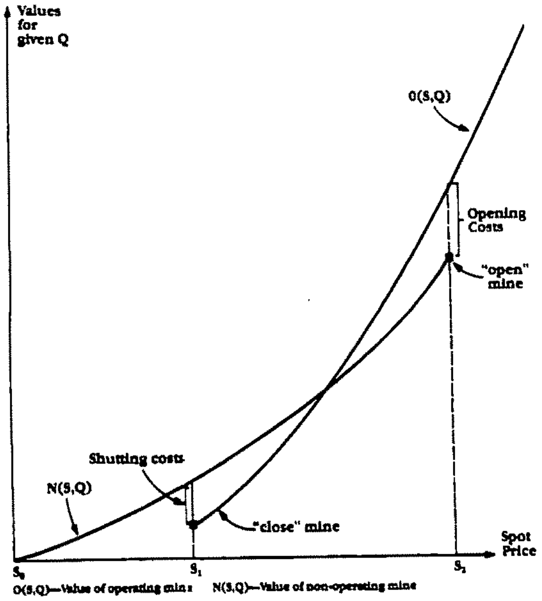
(1) whether it is currently open and producing, or closed and incurring maintenance costs;
(2) the reserves remaining in the mine;
(3) the current price for coal and its estimated variance rate;
(4) the operating (i.e. extraction) costs.

The value of a mine may be shown graphically, as in Figure 1.

The graph plots the value of a coal mine as a function of the (spot) price for a given level of mine inventory (reserves), Q, and level of operating costs, OC. The line O(S, Q) represents the value of an operating mine; N(S, Q) that of a non-operating mine. The net revenue valuation line N(S, Q) values the potential output available from opening a currently closed mine. The early, lower part of the line lies above that for an already open mine, O(S, Q), because the necessary shutting costs have already been paid. The upper part of the line N(S, Q) lies below O(S, Q) because, in order to obtain the closed mine's net revenues, the opening costs would have to be incurred.

To understand better what the graph means, suppose that the mine is initially shut and that the spot price is between S1 and S2. As the spot price rises the value of the mine when open and operating begins to exceed the value of the mine when shut, but not by enough to cover the costs of opening the mine. It is not worthwhile opening the mine until the spot price reaches S2, at which point the value of the mine in operation exceeds its value shut by just the amount of the opening costs. Once the mine has been opened it should remain open and operating until the spot price falls to S1 or below. Finally, note that if the salvage value of the mine is zero (it may sometimes be negative) it will not be optimal to cease maintaining it (and hence abandon it) until the spot price falls to SO.

**Figure 1**
**The Value of a Mine in Terms of the Current Spot Price of the Commodity**
*Source*: Brennan and Schwartz (1985).



This technique has potential reforming power because it would not be difficult to introduce social costs into decision making, e.g. redundancy or unemployment pay, by adding them into shutting costs. Their inclusion would lower the apparent attractions of pit closures. Similarly, if the opening of a new mine would cause the premature abandonment of an existing mine, then the costs of abandonment could be added into the opening costs of the new mine.

### *Three Ways of Pricing Coal*

It was stated earlier that conventional economic and accounting analyses depend on the existence of meaningful market prices for their validity. There are at least three ways of pricing coal, but none of them is an adequate basis for making closure decisions.

We have referred frequently to the spot price of coal, which is our first pricing method. However, only about 7% of the world's coal production is internationally traded in this way, so one cannot be sure what 'information content' this price has for decisions now which may have effects many years into the future. Over 75% of British Coal's output currently goes to another (soon to be privatised) nationalised industry, the CEGB, for a 'negotiated' price, so what arguably matters more is the price obtainable for a particular mine's output, which in many cases would be a price after blending with the output of one or more other mines. This is the second pricing method, but it is important to note that area directors determine the price imputed to transfers between pits for blending, and so can manipulate their accounting results and closure decisions (see the oral evidence by Professor Cooper to the Select Committee on Energy, Session 1985/86, para. 651).

A third way of pricing the coal would be to look at the net benefits yielded by holding a stock of it. The principal benefits are, first, the production cost savings which can be made by the avoidance of the interruptions in production which would inevitably occur if the ability to stockpile were removed and, second, the ability to take advantage of unforeseen increases in demand. Collectively these two benefits, net of the costs of holding and storing the stock, can be termed the 'convenience yield' of the stock. It is the marginal convenience yield, the extra services yielded by an extra unit of stock, which must be taken into account when valuing future units of production. The present value of a unit of future production of coal is equal to the current price of coal discounted by this marginal convenience yield. The marginal convenience yield could also be inferred from the relation between the spot and future prices of coal in an efficient market, if such existed for coal, which is highly debatable!

This third, convenience yield, approach avoids simultaneously the twin problems of assessing a discount rate appropriate to the risk of the mine's revenues and of estimating the future price of coal. However, it is necessary to estimate the convenience yield (which will tend to fall as stockpiles rise). In general, it may be a function of either the spot price or the transfer price to the CEGB, which latter may also be affected by the spot price. As the spot market only handles a small proportion of world coal sales, it is hard to know how much reliance to place on the spot price, which is quite volatile. This reflects the 'distress' nature of some of the trades and the influence of the prices of substitutes, such as oil, which have been particularly volatile in recent years. This uncertainty about the spot price of coal is especially unfortunate as an estimate of its variance is necessary in order to operationalise the OPM!

This circularity and indeterminacy of argument is a good illustration of the pit closure problem. Additional problems in determining the convenience yield would be estimating the production cost savings and calculating an appropriate holding cost. The latter would involve estimating the opportunity cost of capital for the NCB, something which the adoption of this approach was hoped to avoid.

We conclude this section by observing that, while the OPM offers some new insights and avoids some problems of the present value approach, it introduces problems of its own. There is, sadly, no perfect accounting/finance solution to the pit closure problem.

## Some potentially liberating models

We can think of three other models which might enable one to include social costs and benefits in British Coal's planning process. These are data envelopment analysis (e.g. as in Thanassoulis, Dyson and Foster, 1985); mixed scanning (e.g. as in Etzioni, 1986); and binary 'pairwise' comparisons (e.g. as in Jensen, 1983).

The first of these is best when making comparisons between large numbers of broadly similar units, but as pits are geologically unique this model is likely to be of limited use. The second is a hierarchical mode of decision making, which distinguishes between fundamental decisions and incremental decisions. It is an attractive alternative to rationalism and incrementalism, as it is less demanding than the evaluation of all possible alternatives implied by rationalism, and more strategic than incrementalism. The fundamental decision for coal is the level of demand for coal as determined by UK energy policy: this should be met by observing the principle of conservation, whilst also taking externalities into consideration. All other decisions would be lower-order, incremental ones.

Under the system of binary comparisons multiple economic and social objectives may be compared in pairs, giving rise to either proximity or dominance data. In the case of British Coal, Schumacher's principle of conservation should dominate everything else. The system would require the NCB's managers and its sponsoring ministry to make comparisons of financial and non-financial performance measures and social objectives, pair-by-pair, until a set of (not necessarily unique) rankings is achieved. This might be easier to implement than the prescriptions of welfare economics, and hence more likely to achieve radical change.

We believe that either of these last two models is a better framework for planning than the current profit-planning system. However, we acknowledge that the implementation of these or any other methods would require the political will to do so, and in the current political climate this seems unlikely. This is unfortunate, because '... the concentration of capacity in the central coalfield has serious strategic implications for energy policy. If the pits in the peripheral areas are closed then the enormous reserves of coal there may be sterilised... [which] also exhausts central reserves sooner than would otherwise be the case. Selby's 240 million tonnes of currently winnable reserves will be gone in 20 years at the NCB's rate of extraction, while the rest of the central area's reserves might only last 50 years. This is in contrast with total national reserves of about 300 years if existing collieries are maintained' (Winterton and Winterton, 1985/86, para. 4.4).

## Conclusion

We conclude that the pit closure problem is a very complex one, as we hope our general model has made clear. Nevertheless, policy makers have to make decisions. We believe that decisions about British Coal cannot be taken in isolation from UK energy policy as a whole, and that the accountants' tools of financial decision making need to be supplemented by an explicit, if subjective, consideration of social and ecological effects. We accept that weighting these separate factors would be problematic, but this does not, in our opinion, justify their continued exclusion from policy decisions. This lack has been a deficiency of nationalised industry decision making for too long.

The 'rationality' of pit closures can only be understood in their political context, which currently is the government's privatisation programme. But privatisation, whether of coal, electricity or both, will not satisfactorily solve the pit closure problem, as market solutions in the interest of profit will violate Schumacher's principle of conservation. What is needed is a government co-ordinated UK energy policy which is not determined solely by considerations of profit. Within such a policy, British Coal's planning should have a framework which is guided by Schumacher's principle of conservation.

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# Ex-Effects: An Empirical Reassessment of the Clientele Effect Using UK Data*

**Ian R. Davidson and Chris A. Mallin**

**Abstract**—This paper deals with two empirical aspects of the Elton and Gruber tax-induced clientele hypothesis. The first is the extent to which estimates of the central location of the 'ex-dividend' statistic, or marginal capitalisation of the dividend due, is influenced by different methods of estimation. The second is the degree to which the widely reported 'dividend yield' effect is a robust feature of the data, or whether its origins lie in aggregation effects or thin trading. The results suggest that the yield effect is much weaker than is generally claimed, bringing into question the simple tax-induced clientele hypothesis as the main explanation of cum-div to ex-div market value transitions.

## Introduction

Most analyses of the tax implications of financial policy assume that funds retained within the corporate sector are capitalised in market prices on a £1 for £1 basis, a position Bradford (1981) refers to as the 'conventional view'. This assumption has been brought into question in two quite distinct areas of the financial literature, which deal respectively with long and short term equilibrium.

In a seminal theoretical study, Auerbach (1979) shows that, in a rational expectations equilibrium, funds held by the corporate sector are not capitalised by the market on the conventional basis above, but on a £$q$ for £1 basis, where under a classical corporate tax system (and in an equilibrium under which dividends are paid) Tobin's $q$ is strictly less than unity. More precisely, under 'representative individual' assumptions, with $t_m$ defined as the marginal tax rate and $z$ as the effective capital gains tax rate, the value of $q$ is $q = (1 - t_m)/(1 - z)$. A similar position is arrived at by Bradford (1981), except that he ignores capital taxes. Auerbach describes this position as the 'capitalisation' view, and goes on to show that despite windfall gains and losses, unanticipated financial and fiscal decisions may have little effect on equilibrium debt-equity ratios and dividend policy. The intuition for this position is that, if the only mechanism for transmitting funds from the corporate to the private sector is by means of dividend, then any retention can be viewed as a deferred dividend. Thus it is rational for investors to capitalise eventual taxes on distributions in forming their valuations.

As discussed in Davidson (1989), the short term ex-dividend study of Elton and Gruber (EG) (1970) is apparently consistent with the capitalisation position. Under representative tax rate assumptions, EG show that the marginal capitalisation rate (henceforward $K_d$) of a dividend due, has an identical form to Auerbach's marginal $q$ above if the cum to ex-dividend price transition is to present no arbitrage opportunities, i.e., under a classical system,

$$K_d = (P_c - P_x)/d = (1 - t_m)/(1 - z) \qquad (1)$$

where $P_c$ is the last cum-dividend price, $P_x$ is the consequent ex-dividend price, and $d$ is the dividend due. Furthermore, they go on to show empirically that $K_d$ is an increasing function of dividend yield, implying that high dividend yield shares are held by investors with lower marginal tax rates, and vice versa. As Hess (1982) points out, this pattern of ownership would minimise the aggregate liability to dividend taxes. However, the direct evidence of Lewellen, Stanley, Lease and Schlarbaum (1978) finds that, across a sample of investors' portfolios, there is little evidence of a systematic variation in dividend yield as a function of investors' marginal tax rates.

The purpose of this paper is to identify and analyse, using UK data, some of the empirical problems that are endemic to the Elton and Gruber (EG) study. In section 1, the EG study is repeated to confirm that their apparent clientele effect is present in the data. There are three samples, viz: (i) an interim dividend sample, (ii) a final dividend sample (for the same firms) and (iii) a pooled interim-final dividend sample (i.e., i and ii together). In section 2, the central location of $K_d$ is investigated using various regression techniques, the results indicating that, where less emphasis is given to outliers, a value of $K_d$ equal to unity cannot be rejected. In section 3, the clientele evidence is assessed directly, the results suggesting that the yield effect is much less persuasive if allowance is made for aggregation effects and thin trading. The conclusions are presented in section 4.

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*The authors are respectively Boots Professor of Accounting and Finance and Lecturer in Accounting and Finance, Department of Industrial Economics, University of Nottingham. They are grateful for much constructive input from Professor Geoff Whittington (University of Cambridge), and Professor Mark Tippett (Australian National University). The comments of an anonymous referee were also helpful.

## 1. The data

The data are the same as those used to investigate ex-dividend, ex-rights corroboration in Davidson (1989). To that extent a possible selection bias effect cannot be ruled out since companies chosen were those that had issued simple stock subscription rights in the fiscal years 1984/5 and 1985/6. Two possible consequences might be: (1) a non-representative sample and (2) some corroborative effect between rights issues and dividend valuation effects. In respect of (1), a chi-squared test for independence of classification was carried out, using *The Financial Times* share information classifications. This indeed rejected independence at the 1% level, mainly because of the high propensity of 'industrials' to issue rights. However, this finding is not of particular concern to the arguments which follow, which are concerned with the methods of estimation. In respect of (2), there is little reason *a priori* to suspect any systematic bias in cum to ex-dividend price changes as a result of a rights issue having taken place, especially in the light of the results of Davidson (1989) which found no evidence for common 'ex-day' valuation effects between dividends and rights issues.

The ensuing sample consisted of 104 companies generating 172 ex-dividend events, of which 104 were final dividends and 80 were interim dividends (i.e., 24 firms paid no interim dividend), hence there were 80 paired interim and final dividend events. All ex-prices were adjusted for general market movements by multiplying each ex-price by the ratio $I_c/I_x$, where $I_c$ is the appropriate market index at the time of the last 'cum' quotation, and $I_x$ is the closing market index on the 'ex' day. A similar adjustment was used by Kalay (1982).

## 2. Central estimates of $K_d$

### *A. Direct Estimates of $K_d$*

Interpreting the ex-dividend effect is complicated by the imputation system. Taking the conventional view, each £1 of *net* dividend should decrease the value of the firm by £1 (i.e., $K_d = 1$). Conversely, the capitalisation view implies that $K_d$ is determined by the gross dividend multiplied by one minus the marginal tax rate of the 'value forming' clientele, ignoring capital taxes which are likely to be less influential than income tax because (i) they are charged on realisation and not on accrual, and (ii) substantial reliefs and offset are available. Under this assumption the 'no-arbitrage' value change is given by:

$$P_c - P_x = d.(1 - t_m)/(1 - t_p) \qquad (2)$$

where $d$ is the net dividend, and $t_p$ is the imputation rate which was constant over the sample period at 30%. The corresponding Elton and Gruber (1970) ex-div statistic ($K_d$) expression becomes:

$$K_d \equiv (P_c - P_x)/d = (1 - t_m)/(1 - t_p) \qquad (3)$$

Consistent with previous studies, the distribution of $K_d$ obtained by direct measurement resulted in reasonable evidence that the central location of $K_d$ was less than unity. For the final dividends, the mean market-adjusted $K_d$ of 0.51 was significantly different from unity at the 1% level; whereas for the interim dividends, the corresponding mean $K_d$ (from a much noisier distribution) was 0.93, which was not significantly different from unity at the 5% level. Interestingly, whereas market adjustment had little effect on the final dividend $K_d$, the unadjusted interim mean $K_d$ of 0.54 was appreciably lower than the adjusted value—an odd finding that was not satisfactorily resolved.

Under the capitalisation view, the implied marginal tax rate under the UK imputation system (with capital gains tax at an effective rate $z$) is given by:

$$t_m = 1 - K_d(1 - t_p)(1 - z) \qquad (4)$$

The implied average marginal tax rate is high at 64.3% with a $K_d$ of 0.51 (when $z = 0$ and $t_p = 0.3$). However, the implied individual rates were highly dispersed, with some values well in excess of 100%, and others less than zero.

Hence on the basis of the summary ex-dividend evidence, neither the conventional view (that $K_d = 1$) nor the capitalisation hypothesis (that $K_d$ reflects tax perturbations) appears plausible. However, Davidson's (1989) finding that for ex-rights events a marginal capitalisation ($K_r$) of unity cannot be rejected suggests that it might be premature to dismiss the conventional view. Since the proportion of dividend to market value is invariably lower than the new capital to market value ratio for a rights issue, the tendency of the mean value of $K_d$ to be less than unity might simply reflect some stickiness in the price adjustment process.

### *B. Regression Estimates of* $K_d$ *(henceforward, K)*

The standard model of stock price dynamics is the Itô process, which can be represented by the formalism:

$$dP/P = m.dt + s.dz \qquad (5)$$

where $P$ is the stock price, $m$ is the instantaneous mean return, $s$ is the instantaneous standard deviation, and $dz$ is a Weiner process. Over a short interval $(t_2 - t_1)$, the return distribution

$(P_{t2} - P_{t1})/P_{t1}$ is asymptotically normal, its variance being $(t_2 - t_1)s^2$. The estimation of this process in cross-section across the ex-div date runs into a number of difficulties. First, the dividend itself, perturbed by an unknown $K$-factor (the main object of interest), is part of the return process. Second, cross-sectional estimation assumes that the underlying means and standard deviations of the individual stock return distributions are equal: clearly this is not very satisfactory. The time interval presents less of a problem, since the time separation between the last cum-div price and the ex-div price is generally the same for all the stocks sampled (London Stock Exchange rules requiring the ex-div date to be a Monday). The procedure adopted was as follows.

Assume that *ex ante* stock '$i$' is anticipated to have an *ex div* statistic of $K_i$, so:

$$(P_{X,i} + K_i d_i - P_{C,i})/P_{C,i} = a_i + u_i \qquad (6)$$

If unadjusted prices are used, $a_i$ would be expected to be greater than zero to reflect the underlying return on the security between the cum- and ex-dates. Formally this 'constant' is a function of the cum- to ex-time separation, and under standard market equilibrium assumptions is also conditional on the individual security and the market rate of return over the interval. For cross-sectional purposes, this is not satisfactory since the ex-events are sampled at different times and it is implausible to restrict the market rate of return to be constant. The simplest solution is to adjust the *ex-div* price for general market movement. Whereas this assumes that all stocks have equal responsiveness, it is better than assuming that the market return is constant, and over the short sampling interval is unlikely to be much worse than using the market model with pre-determined betas. With this adjustment to the prices, *a priori* $a_i = 0$.

$P_C$ and $d$ are predetermined (assumed non-stochastic). The status of $K$ is less secure. It is assumed that (6) can be rearranged, without upsetting the error process, to:

$$(P_{X,i} - P_{C,i})/P_{C,i} = a_i - K_i(d_i/P_{C,i}) + u_i \qquad (7)$$

For conciseness, the left hand side will be denoted $R_i$. Since the cum-div price generally exceeds the ex-div price, this quantity is usually negative.

Equation (7) provides a means of obtaining an estimate of the central location of $K$, subject to the reservations outlined above. A broadly similar specification is used by Hess (1982), except that he estimates the equation in time series using both dividend-paying and non-dividend-paying months.

Based on (7), the initial estimating equation was:

$$R_i = (a) + b.(d/P_C)_i + v_i \qquad (8)$$

Under the assumed error process, OLS should provide best linear unbiased estimates of the parameters of (8). The estimate of $K$ is given by $-\hat{b}$. *A priori*, $a = 0$ when the constant is included.

OLS estimation was carried out for the pooled, final, and interim dividend samples, both with and without a constant. The estimated constant was not significantly different from zero, although suppressing it affected the $K$ estimates, especially from the final dividend sample. This restriction appeared to have little effect on the explanatory power of the model (the $R^2$ statistic being typically of the order of 15%). There was no evidence of serial correlation, and the residuals appeared to show no evidence of systematic influences, although for the sample of 172 a chi-squared test for normality was rejected at the 5% level (e.g., when the constant was included, the test statistic was 26.0 against a critical value of 19.7). The histogram of residuals produced by Shazam showed that although the general shape seemed not inconsistent with normality, the tails showed some evidence of truncation, especially at the upper end. This may be due to the presence of arbitrage bounds, but the evidence is weak.

Using the adjusted data, the estimates of $K$, together with their standard errors, are shown in table 1.

These estimates are somewhat higher than the summary statistic values reported previously, and are only significantly different from unity (two tailed test) if the underlying returns are restricted by suppression of the constant (but a $K$-value of

**Table 1**
**Estimated Ex-dividend $K$-values (OLS)**

| *Sample* | *Pooled (172)* | *Final (92)* | *Interim (80)* |
|---|---|---|---|
| With Constant | | | |
| $K$ estimate | 0.765 | 0.926 | 0.704 |
| s. error | (0.157) | (0.226) | (0.276) |
| Without Constant | | | |
| $K$ estimate | *0.734 | *0.693 | 0.856 |
| s. error | (0.079) | (0.105) | (0.126) |

* = significantly different from unity at the 5% level

unity cannot be rejected for the interim dividend sample).

Although a normal error distribution is not essential for OLS to give best unbiased estimates, it seemed worthwhile to experiment with different estimating procedures.

(i) Over longer sampling periods with the price relative $P_X/P_C = 1 + R_i$ as the dependent variable, the error distribution would be lognormal. Under this assumption, (8) becomes:

$$(P_X/P_C)_i = a + b.(d/P_C)_i + w_i \qquad (9)$$

*A priori*, $a = 1$ (if the *ex-div* share price is adjusted for market movements), and the estimate of $K$ is $-\hat{b}$. This equation was estimated using the Maximum Likelihood (MLE) routine in Shazam. The estimate of $K$ from the pooled sample (0.768) was virtually the same as that obtained by OLS with constant (0.765), the $R^2$ goodness of fit criterion being identical at 11.3%. A similar close correspondence was obtained for the other samples.

(ii) A further alternative is to assume a Cauchy distribution for the error term in (8), on the basis that both $P_X$ and $P_C$ may well have (normal) stochastic components due to measurement error. An estimation routine is provided in '*S*', but little diagnostic information is generated. However, the plausibility of the error process was investigated using the 'QQ' (Quantile-Quantile) plot procedure. The correspondence was found to be poor, the generated Cauchy distribution having tails that appeared to be too fat for the error distribution from the data.

(iii) Since the return distribution is noisy, conventional estimation techniques can be influenced considerably by outliers. Thus a good argument can be made for the use of a robust technique such as the Least Absolute Deviation (LAD) procedure. The general $L_p$ estimator is given by the value of $b$ (in equation 8) that minimises:

$$\sum_{i=1}^{N} |y_i - \hat{y}_i|^p \qquad (10)$$

The conventional wisdom is that, the noisier the distribution, the lower the appropriate value of $p$. For the present problem, the value $p = 1$ was chosen, with (8) being used as the estimating equation. The estimates produced by '*S*' gave a $K$ estimate of 0.993 for the pooled sample, 1.183 for the final dividend sample of 92, and 1.050 for the interim sample of 80. The fact that the pooled value is lower than that for either subset is perhaps surprising, but does not necessarily point to inconsistency in the estimation procedures (although the results were checked as a precaution). Unfortunately little in the way of diagnostics is provided, but the fact that these estimates span the all important value of unity is in itself an important finding. This suggests that outliers may have considerable influence on estimates of the central location of $K$, implying that empirical results need to be treated with caution.

## 3. Empirical investigation of the clientele effect

### *A. Some* ad hoc *Tests*

Rearrangement of (7) (with firm subscript suppressed) in terms of the Elton and Gruber *ex-div* statistic gives:

$$(P_C - P_X)/d = K + u.(P_C/d) \qquad (11)$$

Where $d$ is low, $P_C/d$ will be large and positive. If '$u$' is approximately normal, and if the 'underlying' $K$ is reasonably constant, the observed values of $(P_C - P_X)/d$ plotted against $d/P_C$ will have a dispersion very much as observed in figure 1, with the scatter being wider when the dividend is low. (Note that the horizontal axis is the similar $d/P_X$ in this diagram.) The symmetry of this scatter around the horizontal axis suggests little in the way of possible clientele effects. However, $d/P_X$ (or $d/P_C$) is arguably not the most appropriate yield measure to uncover a clientele effect since it only applies to the ex-event in question. Shareholders who intend to keep their shares for the longer term would rationally look to the annual yield ($DY$). The relative ability of $d/P_C$ and $DY$ to explain ex-event market value changes is therefore of some importance.

A simple test of the clientele hypothesis is to expand (11) to capture a linear dividend yield dependence. Thus (using $d/P_C$):

$$(P_{X,i} - P_{C,i})/d_i = b + c.(d/P_C)_i + u_i(P_C/d)_i \qquad (12)$$

(where the constant '$b$' is written for the fixed component of $-K$). Rearrangement of (12) to stabilise the error term gives:

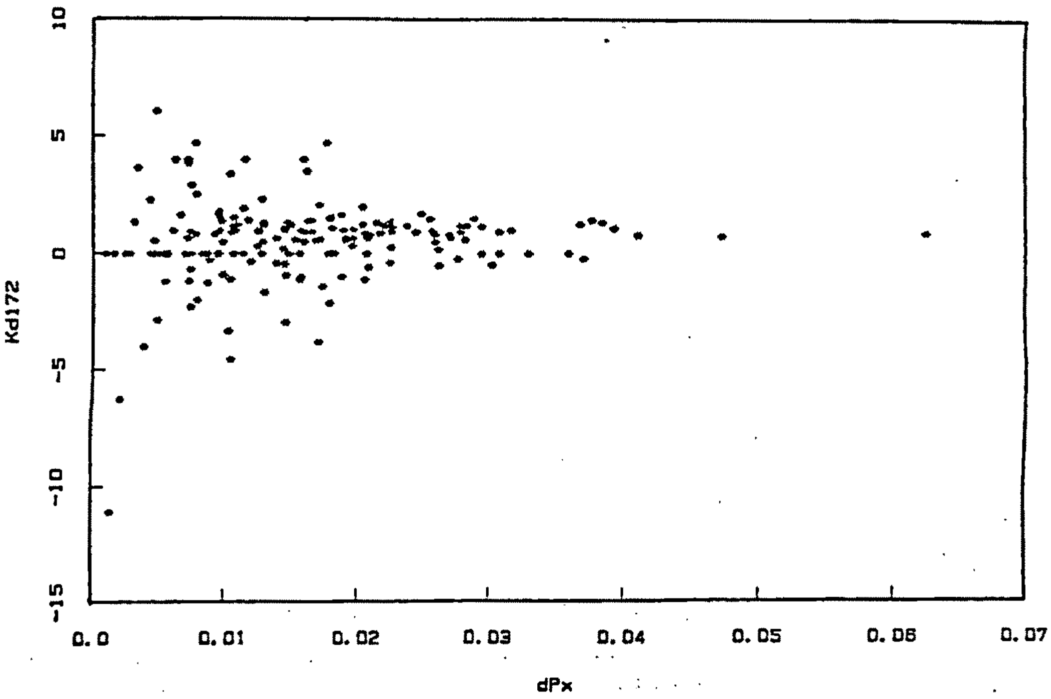
$$[(P_X - P_C)/P_C]_i = b.(d/P_C)_i + c.(d/P_C)_i^2 + u_i \qquad (13)$$

*A priori*, both $b$ and $c$ are less than unity, and a constant '$a$', if included, should be zero if adjusted market prices are used. The dependent variable of (13) is *minus* the EG *ex-div* statistic, hence $c$ less than unity implies that the magnitude of the price 'drop-off' increases with the ratio $d/P_C$.

Equation (13) was estimated in cross-section for the three dividend samples using OLS. In addition, the annualised dividend yield reported in *The Financial Times* (denoted $DY$) was substituted for the measure $d/P_C$ and the equation was re-estimated.

The results are not very good. The major difficulty is that the yield and squared yield terms are highly correlated with each other over the data range, so their influences are difficult to separate out. The main finding is that when the annualised dividend yield is used in place of $d/P_C$, the coefficient '$c$' of the squared yield term generally has

**Figure 1**
**Scatter of Ex-dividend *K*-factor vs $d/P_X$**



greater explanatory power. However, the coefficient of $(d/P_C)^2$ is not significant in any of the samples, whereas the coefficient of $DY^2$ is significant at the 5% level for the final dividend sample. For the interim dividends, this coefficient turns out to be negative (but not significant) under both yield measures. Thus a non-linear influence is suggested only when the annualised yield measure is used.

**Figure 2**
**Scatter of $R_i$ vs $d/P_C$**

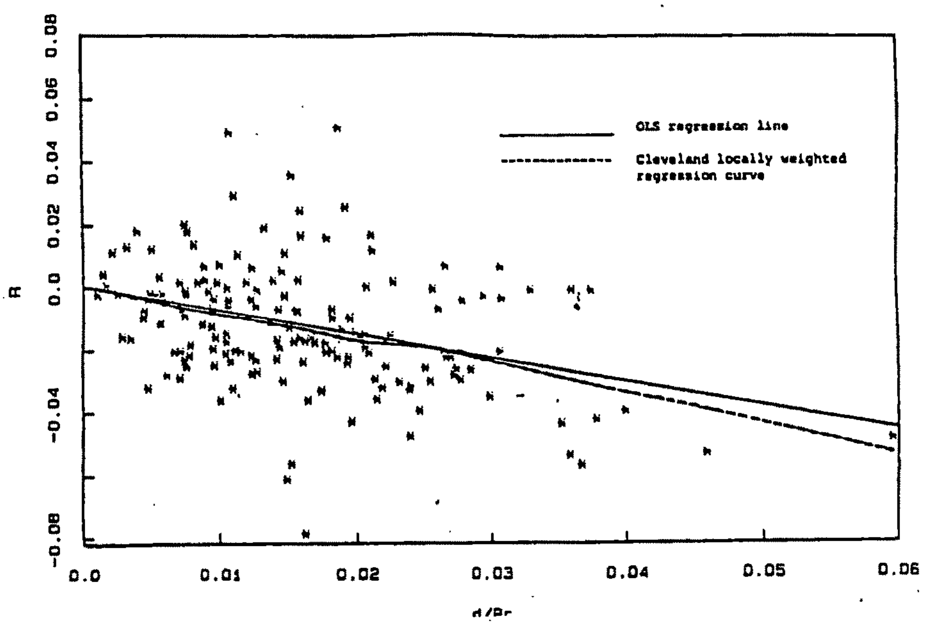
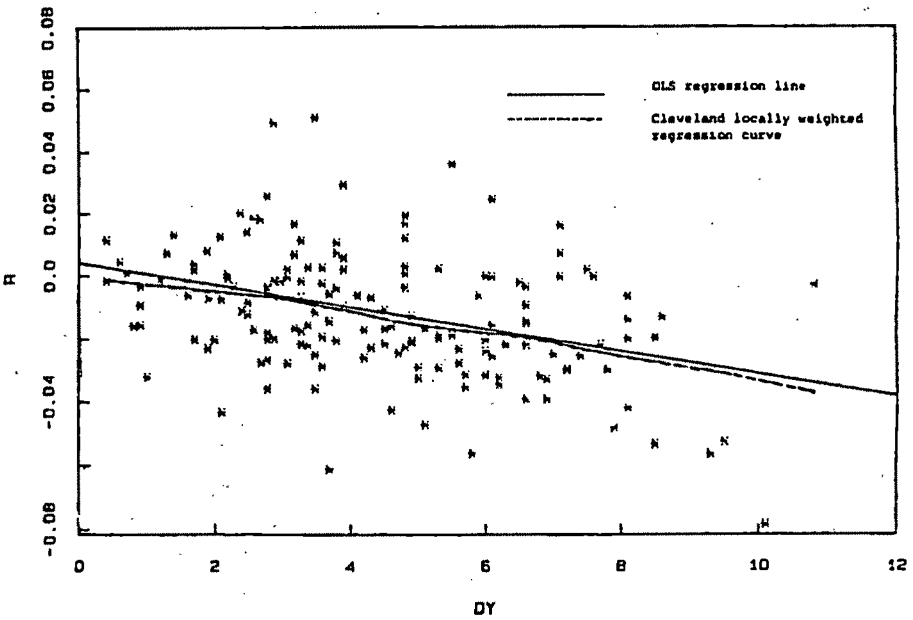
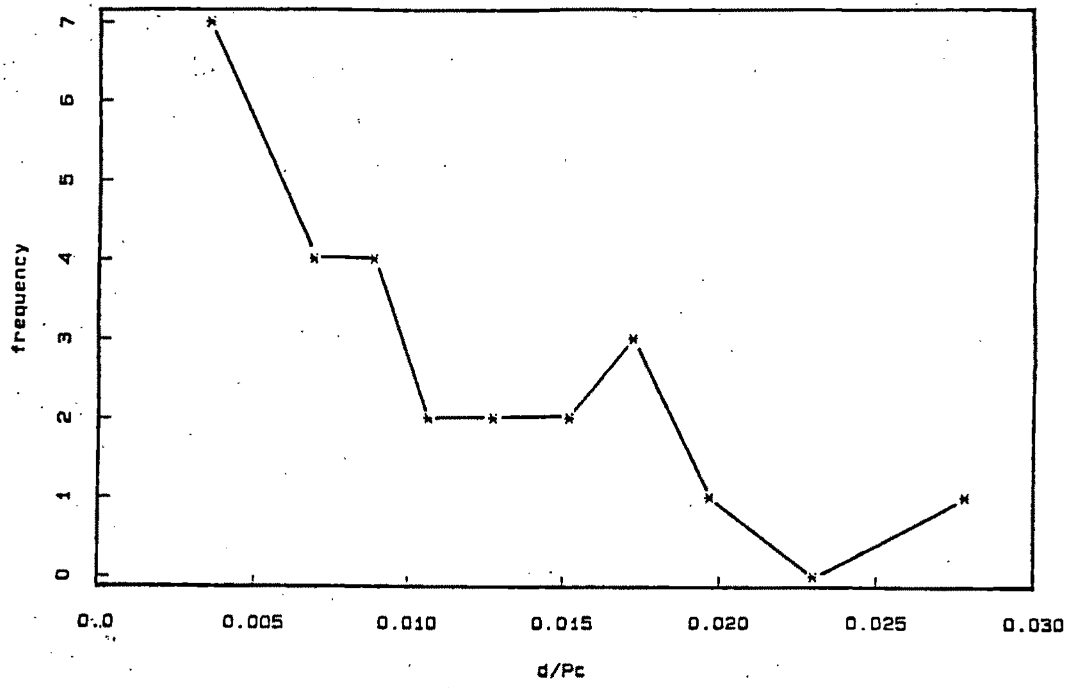


Figure 3
Scatter of $R_i$ vs $DY$



The collinearity problem is generally difficult to counter without more data. However, since the present test is concerned with the non-linear influence of a single variable, a viable diagnostic approach is the Cleveland (1979) robust locally weighted scatter plot routine (discussed in Becker and Chambers, 1984, pp. 348–9). This procedure was carried out on the distribution of $R_i$ versus $d/P_C$, and was repeated using the annualised dividend yield $DY$ as the independent variable. The resulting plots produced by '$S$' are shown in figures 2 and 3. The straight line in each plot is the

Figure 4
Frequency of non-changing cum to ex prices



OLS regression line; the not-so-straight line is the locally weighted regression curve (based on 5-iterations of the Cleveland procedure). In both instances, the departure from linearity seems to be small, suggesting little in the way of a clientele phenomenon.

A simple *ad hoc* test of the influence of annual yield is to see if the ratio $(DY)/(d/P_C)$ has any explanatory power when added to equation (11). Adding this term to the right hand side and rearranging to stabilise the error term gives the following equation:

$$R_i = b.(d/P_C)_i + c.DY_i + u_i \qquad (14)$$

Using OLS on the pooled dividend sample, both $b$ and $c$ were negative but not significantly different from zero (the $t$-ratios being $-1.71$ and $-1.27$ respectively). The negative $b$ value again arises because the components of $R_i$ are ordered in time (so $R_i$ is generally negative). The observed sign of $c$ suggests that the share price decline (i.e., the overall $K$-factor) is higher for shares with high annual dividend yield. This is in line with the EG clientele hypothesis. Slightly better results were obtained from the sample of final dividends, giving the $t$-ratios $-1.90$ and $-1.81$ for the estimates of $b$ and $c$ respectively. Although the $t$-ratio for the coefficient of $DY$ is not high, it is nevertheless significantly greater than zero (one tailed test) at the 5% level, suggesting some further support for the clientele effect. However, since $d/P_C$ and $DY$ are closely related, the $t$-values are somewhat arbitrary.

A further *ad hoc* test of a clientele influence is to see if the 'excluded' $d/P_C$ ratio has any explanatory power for a given ex-event. The following equation was estimated for both the interim and final dividend ex-div events:

$$R_i = a + b.(d_0/P_C)_i + c.(d_1/P_C)_i + u_i \qquad (15)$$

The object was to see if the final dividend $d_1/P_C$ ratio appeared relevant to the interim ex-effect, or if the interim dividend $d_0/P_C$ ratio appeared relevant to the final ex-effect. (The cum div prices were sampled at the last cum div dates for the event in question.) For both samples, the 'non-relevant' $d/P_C$ was found to have little significance (the $t$-ratios being $-0.32$ for the interim $d/P_C$ in the final dividend equation, and $-0.17$ for the final $d/P_C$ in the interim dividend equation). The signs of the coefficients are consistent with the clientele effect, but the evidence is weak.

### *B. Thin Trading*

Thin trading would appear to provide an intuitively appealing explanation for the tendency of $K_d$ to increase with dividend yield. If the dividend is low, then there may be little pressure for the price to change across the ex-date—with no price change resulting in an unadjusted $K_d$ value of zero. For 16% of the pooled sample, there was no cum- to ex-price change, this tendency decreasing with the ratio $d/P_C$ as shown in figure 4.

If thin trading were the main explanatory factor, the apparent clientele effect would be expected to be stronger if $d/P_C$ (or $d/P_X$) were used in place of the annual yield $DY$.

However, the results of the last sub-section suggest this is not the case. As a prelude to examining the influences on $K$ more directly, the question of aggregation effects merits attention.

### *C. Aggregation Effects*

The first line of enquiry was to see if there was any evidence of a non-linear relationship in cross-section between the ratio $d/P_C$ for an ex-event, and the corresponding annual yield $DY$.

Using five iterations of the Cleveland (1979) robust locally weighted scatterplot routine, evidence of non-linearity was found, providing *prima facie* evidence of an aggregation problem. It appears that there are two causes. The first is a consequence of not all firms paying the same number of dividends; the second is the effect of share price changes through time.

The first problem can be seen as follows. Let $D_1$ be the dividend for the year, composed of an interim dividend $d_0$ and a final dividend $d_1$. A graph of $d_1 + d_0$ versus $D_1$ would obviously give a '45 degree' line, and if an individual dividend, say $d_1$, is plotted against $D_1$ then the point must lie on or underneath this line. Furthermore, the final and interim dividends should sum vertically to the '45 degree' line.

The implication of the vertical additivity is that, where there are two dividends paid in a year, the regression line of individual dividend against annual dividend $D_1$ would go through the midpoint of the vertical distances from the $D_1$ axis to the '45-degree' line (i.e., giving a line of slope $\tan^{-1}$ 0.5 or 26.6 degrees). Where only one dividend is paid, however, the corresponding 'average' dividend lies on the 45 degree itself, unless consistency is restored by including the missing dividend as zero. This problem would be carried through directly to the dividend yield measures $d/P_C$ and $DY$ if they were calculated relative to the same share price; however, since the price varies over the sample interval, the effect will be approximate. The non-linearity in the $d/P_C$ to $DY$ relationship arises because firms that pay low annual dividends have a higher probability of paying only one dividend.

The second aggregation difficulty is that the denominators of the yield measure, i.e., the share prices, are measured at different times. This destroys the vertical adding up because (i) the dividends in the numerator are backward looking, so will not allow for the second dividend in the sample; and (ii) the stock price in the denominator is unlikely to be the same for the two ex-div events. To investigate this problem, a 'synthesised' annual dividend yield ($DY^*$) was calculated and used in subsequent tests, given by $DY^* = D_1/P_C$, where $D_1$ is the sum of the interim and final dividend, and $P_C$ is the last cum-div price for the final dividend; it is also used as the denominator for the individual dividend to price measures to preserve 'adding-up' (so $D_1/P_C = d_0/P_C + d_1/P_C$).

These points suggest that a better test to investigate whether the annualised yield adds incremental explanatory power, beyond that of the $d/P_C$ appropriate for the ex-event, would (a) discard any firm that did not pay two dividends (although treating the missing one as zero is permissible), and (b) use the synthesised yield $DY^*$ which imposes additivity on the interim and final yield for a given firm, and hence circumvents the direct aggregation problem discussed above. These procedures were carried out, reducing the pooled sample to 160, and the relationship between $d/P_C$ and $DY^*$ was found to have little evidence of curvature using the Cleveland procedure.

In the procedures described above, the effect of using the synthesised yield measure $DY^*$ was generally to reduce the strength of any apparent clientele effect. For example, in (13) this resulted in estimates of '$c$' that were not significantly different from zero for both the final and interim dividend samples, the coefficient of $c$ being negative for the final dividends ($t$-ratio $-0.32$), and positive for the interim dividends ($t$-ratio 0.75), but not significantly different from zero in either case.

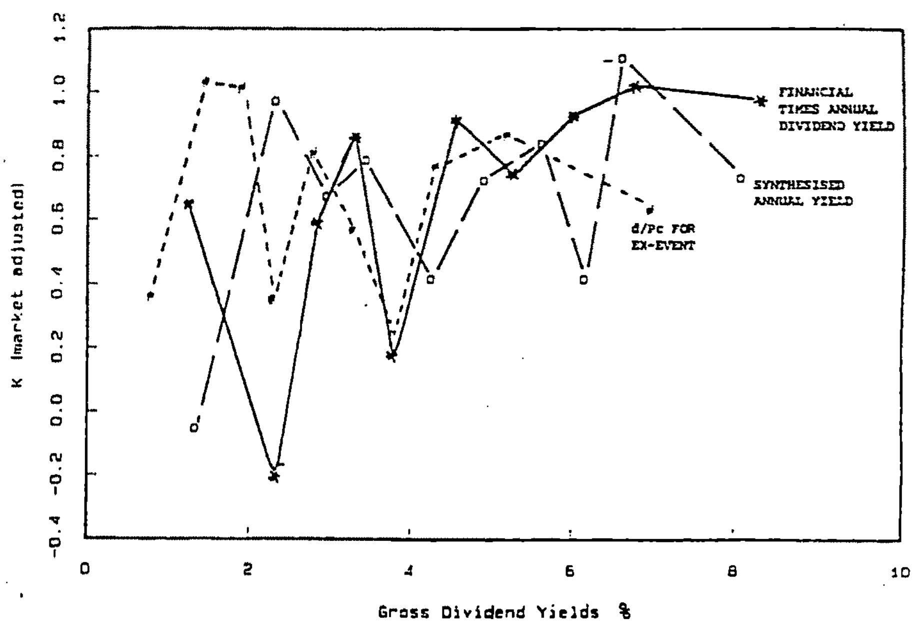
### *D. Grouped Data*

Using the Elton and Gruber grouping procedure, the Spearman rank correlations were investigated using (i) *The Financial Times* (gross) annual dividend yield ($DY$), (ii) the $d/P_C$ ratio for the ex-event in question, 'grossed-up' for comparability, and (iii) the synthesised yield measure $DY^*$, 'grossed-up' for comparability. (The 'grossing-up' consisted of a simple scale factor adjustment of 1/0.7 to allow for the 30% imputation rate—it does not affect the correlation analysis.) The sample consisted of 160 ex-dividend events, i.e., both interim and final dividends for the firms which paid both (the 12 firms that paid only one dividend being excluded). Each sample was sorted into order of the appropriate dividend yield, and then divided into the 10 decile groups (16 events per group). The mean dividend yield and mean $K$-factor was calculated, giving 10 paired group means for each sample.

Following Elton and Gruber, Spearman's rank correlation coefficient was calculated to measure the association between the yield and $K$-factor means for each sample. Using the FT dividend yield, a rank correlation of 0.82 was obtained; using the synthesised yield, this was reduced to 0.28; and using the actual $d/P_C$, the rank correlation was $-0.04$. The variation of group means with $K$ (for all three samples) is shown in figure 5.

To the extent that thin trading influences should have a comparable effect on the reported FT annual yield and the synthesised measure, the results still suggest that the widely disseminated

**Figure 5**
***K* vs dividend yields (grouped data)**



*Financial Times* dividend yield might have incremental explanatory power. To this extent, a weak clientele effect cannot be ruled out, with the FT annual yield having particular importance in the market's information set. However, if the clientele effect were strong, then it would be expected to show up strongly using the synthesised yield measure—this it fails to do.

## 4. Conclusions

The following conclusions are suggested by the analysis of this paper.

(I) Estimates of the central location of $K_d$ are sensitive to the estimation method employed. This is because the distribution of $K_d$ values is very noisy. Indeed, it is not clear that the central location of $K_d$ really merits the attention paid to it, given its wide dispersion. For almost exactly 1/3 of the final dividend sample, the adjusted $K_d$ value exceeded the critical value of unity. Using OLS and MLE estimation on the error-stabilised stochastic model of section 3, its estimated value was just about significantly less than unity. However, the robust $L_1$ estimator, which gives outliers less weight than OLS, gave values much closer to, or in excess of, unity. These results provide a weak basis on which to reject the conventional view ($K_d = 1$) in favour of the capitalisation view.

(II) Evidence in favour of Elton and Gruber's (1970) clientele effect, in which $K_d$ increases with dividend yield to reflect the lower marginal tax rate of investors in high dividend paying stocks, was weak in the individual firm data but stronger in the grouped data. The evidence was at its strongest when the *Financial Times* annual dividend yield ($DY$) was used as the yield measure. When either the actual dividend price ratio ($d/P_C$) or a synthesised annual yield measure ($DY^*$ – the sum of the interim plus final dividend over the 'final dividend' cum-div price) was used, the effect was much weaker. It was shown that the ratio $d/P_C$ can have an apparently non-linear variation with either annual yield measure due to aggregation effects. This is considerably amplified if firms in the sample pay a different number of dividends in the year. However, careful attention to the treatment of the choice of yield showed that a weak association with the ex-dividend $K_d$ factors could not be ruled out entirely.

If there is a tendency for $K_d$ to increase with dividend yield, there are three plausible explanations, viz:

(i) Trading may be thinner where the dividend is low. In a significant number of cases the ex-div price was the same as the cum-div price, especially when the dividend was low, giving an unadjusted $K$-value of zero. Since this was less prevalent when the dividend was higher, it suggests a weak tendency for $K_d$ to increase with dividend yield. The problem with this explanation is that the effect should be stronger when measured using $d/P_C$ for the event in question, rather than using an annual yield. The results do not appear to accord with this.

(ii) A general tax-induced clientele effect. This is the standard explanation, but it appears to run counter to the direct evidence (e.g., Lewellen *et al.*, 1978). However, under the UK imputation tax system, institutions with favourable tax status are likely to have a preference for dividends over appreciation, and in addition are likely to be actively trading in the market. The finding that mean $K_d$ values seem to be stabilising close to unity at high dividend yields is consistent with this (if the tax credit can be claimed, the rational $K_d$ value may go above this level).

(iii) Arbitrage boundaries are truncating the distribution of $K_d$ in such a way that the (conditional) mean value increases with dividend yield. The analysis suggested that the data are very noisy within what would appear to be reasonable arbitrage limits. As shown in Davidson (1986, 1987b), to produce the upward slope of $K_d$ with yield, it is necessary for both buyers and sellers to face non-zero transactions costs, and the sellers should be more heterogenous than the buyers in respect of tax rates and transactions costs. However, if this view is correct, then $d/P_C$ for the ex-event should be more strongly related to $K_d$ than the annual yield measure. Again, this runs counter to the evidence of this study.

It is not inconsistent for elements of all these viewpoints to be operating simultaneously. The considered conclusion of this paper is as follows. The 'ex-effect' is generally consistent with the standard type of stochastic process that describes stock price movements through time, except that there is some evidence of (i) arbitrage boundary constraints, and (ii) thin trading when the dividend is low. In addition, there is evidence of a weak tax based clientele effect that appears to operate for firms with high annual dividend yields. This effect operates largely *within* the no-arbitrage boundaries, and so does not show up strongly in individual (as opposed to grouped) data. The implication is that the $K_d$ values result from a complex interaction of arbitrage constraints and weak dividend preferences, and provide an unreliable basis for point estimates of investor tax rates. Furthermore, it suggests that ex-dividend value changes may have little implication for long-term tax induced effects on security prices.

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# Education, Practice and Research in Accounting: Gaps, Closed Loops, Bridges and Magic Accounting*

Tom Lee†

**Abstract**—The intention of this paper is to identify and review the main literature contributions in the area of the relationships between accounting education, practice and research. It attempts to draw together the various perceptions, observations and prescriptions in a coherent theme, and to explain the current state of play in terms of systems thinking. The role of accounting research is particularly emphasised in the paper.

## Introduction

This paper focuses on a serious and continuing concern in the world of accounting about the connections between its education, practice and research functions. The concern is relatively recent, multifarious in nature, and consistently growing. It can be evidenced in a large variety of individual contributions to the accounting literature from the late 1960s to the present day. The nature and role of research in relation to both education and practice is the key issue.

The purpose of this paper is to identify and review the main literature contributions in this area; determine the specific perceptions, observations and prescriptions contained in them; and, from these analyses, draw the identified threads of thinking together in a small number of connected themes that assist in describing the current state of play. Such a review enables possible explanations to be offered about this position, and a suggestion to be made concerning the future role of research. Such a suggestion is contrary to the predominant direction of previous prescriptions.

The structuring of the main literature contributions into a simple framework has revealed that the large majority of accounting research activities do not appear to have had a major part to play in shaping the content of professional education programmes or the conduct of accounting practice, despite continuous concern that the opposite is the case. A considerable proportion of research appears to exist in increasing isolation from education and practice.

This paper seeks a tentative explanation for this state of affairs in terms of systems thinking. If the world of accounting is viewed as a social system that is open or permeable to its environment then the loop of education and practice, and the significant isolation of much of research, can be interpreted as attempted systems closures that have the intended effect of systems stabilisation and control. Underlying this could be the disposition of an occupational grouping such as accountants to create and maintain a form of monopoly of service by strict control of its body of knowledge. Viewed in these terms, accounting research can be identified as a potentially destabilising influence acting against systems equilibrium. With this in mind, the suggestion of the paper is that there should not be any deliberate attempt to bring accounting research into the loop of education and practice. Instead, its potential in the long-term may be best achieved by its present separation from them.

The writings that have been analysed for the purposes of this paper are concerned largely with the connections between practice and research in accounting. They far exceed in number the literature contributions that have been made on the corresponding relationships between education and practice, and education and research. For this reason, it appears appropriate to commence the review with an analysis of the links between practice and research and, from that, proceed to the other connections.[1]

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*This is a substantial revision of a paper entitled 'The Shaping of Accounting' presented at a research conference of the Institute of Chartered Accountants in England and Wales, July 1988. It has benefited from comments of the conference participants and participants at several seminars, an initial review by David Hatherly, and from many helpful suggestions from two anonymous referees. It owes its origins to a 1973 paper on the issue by Bob Sterling, and numerous conversations with him since that time. My thanks are to all those who have assisted in this project—particularly Bob Sterling—and my apologies for mistakes, errors and blind spots that remain despite their attentions.

†The author is Professor of Accountancy and Finance at the University of Edinburgh.

Before commencing the review, it is important to note that the analysis will use the terms 'practice' and 'practitioner' in the sense of covering all aspects of accounting and all accountants; and the term 'profession' will encapsulate all aspects of the professionalised world of accounting—its practitioners, firms and organised bodies. The paper is therefore not intended to limit the comment and discussion to particular sections or topics of accounting.

## Practice and research

The literature contributions that discuss the relationship between practice and research in accounting have a brief history. They first appeared in the late 1960s and early 1970s, and coincided with a rapid and world-wide expansion in university and college-based accounting education. Many of the educators required to cope with this expansion had and continue to have close connections with the accounting profession and its practitioners. And many of these educators have contributed significantly to the literature discussion of the practice and research relationship.

Under these circumstances, it should not be surprising to find the large majority of discussants basing their arguments and comments on an explicit prescription of the interdependence of practice and research in accounting. They clearly believe in the coexistence of the functions and of the mutual benefits to be gained from such coexistence. No commentator has argued that either function should exist without the other.

### *Professional Needs*

Writers on the practice and research connection are also agreed on one fundamental matter of prescription—that research should be conducted primarily to satisfy the need for knowledge by accountants. Research, therefore, is not identified by these commentators as an isolated function but, instead, is either argued or implied as a necessary companion to practice (see, for example, Bedford, 1978; Davidson, 1978; Flint and Shaw, 1981; Hicks, 1972; Shaw, 1984; Stamp, 1985; Weston, 1978; Wolk and Briggs, 1975; Zeff, 1972).

The arguments for this position are normative, and can be explained as a desire to have a research function in accounting that is capable of enhancing its practice by resolving practical problems. A further possible interpretation is that it is an expression of a perceived need for accountants to have a research function in order to maintain a position of power and authority in society. Using and extending the professional power thesis described by Montagna (1974), research can be interpreted as a means of assisting the accounting profession to exercise power by control over the areas of accounting uncertainty and conflict with which it has to cope. For example, Hopwood (1988, p. 16) has argued that research which provides knowledge of accounting policy-making assists the accounting profession to legitimate its institutional role. It adds credibility to its practices, and provides authority for its practitioners.

The professional need for power and authority has been expressed in a number of ways by various writers. However, their views can be summarised in general themes which can be identified from their papers—for example, the need for a unified profession of practitioners and researchers (Flint, 1980); the ability to provide professional and academic leadership (AICPA, 1978; Davidson, 1968); the maintenance of competence, skills and standards (Shaw, 1984); and the ability to cope with change (Davidson, 1968; Shaw, 1984; Sterling, 1973).

### *Relationship Specifics*

The prescription of a strong practice and research relationship in accounting in terms of a professional need for research to support practice creates an impression of a profession using research to assist its members to meet challenges in practice. Hopwood (1988) has provided a specific interpretation of this position. He suggests (pp. 13–14) that the accounting profession appears to require a research function to provide *ex post* rationales for existing practices, that is, the need to obtain the accounting knowledge necessary to respond to the pressures of regulators and other parties concerned about the credibility of accounting practice.

As previously mentioned, such an explanation conveys a view of research being used to support, justify and control the uncertainties inherent in practice. It is a perception that is compatible with researched observations in other studies (for example, in Birkett and Walker, 1970; Gaffikin, 1987; Watts and Zimmerman, 1979). But it suggests a bias in the relationship—that research is more a consequence of practice than vice versa. There is little suggestion in these writings that research is perceived as the *origin* of accounting practice. ✓

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[1] It should also be noted that, for purposes of providing credibility to the analysis, it has been necessary to cite many writings as evidence. Inevitably, this creates disruption for the reader, and it is hoped that, by giving the author and date only in most cases in the text, the inconvenience has been minimised. Only with respect to very specific referenced comments have page numbers been detailed. However, in the bibliography, the full page references have been given, including the specific pages relating to larger works.

A more detailed study of the relevant literature confirms this conclusion as the dominant perception of the relationship. A belief that much accounting research takes place because of the *prior* existence of accounting practice has been articulated or implied by a number of discussants (for example, Moonitz, 1978; Stamp, 1985; Wolk and Briggs, 1975; Zeff, 1972). Several writers have argued that *all* research should be of potential relevance to practice (for example, Flint and Shaw, 1981; Hicks, 1972; Shaw, 1984; Tricker, 1975). Indeed, Miller (1977) bases his analysis of the relationship strictly in terms of the practitioner as the consumer of research and the researcher as its producer—an approach that has been articulated more recently and at length by Hopwood (1988). The impression is predominantly of research as a reactive process to the problems of practice.

Hopwood (1988) reinforces this interpretation when he comments (p. 4) on what he believes to be the considerable shared views and interests of practitioners and researchers in accounting. This approach can also be evidenced in other comments on the purpose of accounting research, particularly its relevance to such matters as the derivation of the theory underlying existing practice (see, for example, Barden, 1975; Shaw, 1984; Zeff, 1972); and the explanation and reforming of that practice (see, for example, Flint and Shaw, 1981; Hicks, 1972; Manterfield, 1987; Sterling, 1973; Wolk and Briggs, 1975).

### *Nature of Research*

As the previous sections have attempted to indicate, the relationship between practice and research in accounting has usually been discussed in the form of perceptions and prescriptions. The relationship appears to be formulated typically more on the basis of beliefs rather than observations of substance. Much of the comment is therefore judgmental rather than factual.

However, in at least one area, writers appear to have presented their arguments on the basis of observation rather than speculation. This concerns the nature of accounting research, and relates to a general distinction that is crucial to an understanding of the concerns and viewpoints that have been expressed about the relationship between practice and research in accounting; and that is also crucial to the analysis in this paper.

Most literature discussants have observed a division of accounting research into two main categories.[2] These are compatible with the broad classification of research made by Flint and Shaw (1981, p. 136), that is, basic or pure research concerned with normative hypotheses relating to the 'ought to be' of accounting, and descriptive hypotheses to explain or validate the 'what is' of accounting; and applied research directed at improving or fine-tuning existing practices. The latter category tends to be concerned mainly with short-term practical problem-solving, usually on an *ad hoc* basis. When a practical problem is identified, a solution, choice or explanation of immediate use is sought by means of research. In contrast, the former category involves research which is much more speculative and much less easy to assess in terms of utility as its consequences are difficult to determine except in the long-term. It includes searches for new forms of accounting information and new accounting technologies; and for alternative explanations and understandings.[3]

This broad distinction has been made in many writings on the practice and research relationship (for example, in Abdel-khalik, 1983; Baxter, 1988; Davidson, 1968; Flint, 1980; Flint and Shaw, 1981; Hicks, 1972; Miller, 1977; Shaw, 1984; Tricker, 1975, 1979; Tweedie, 1984; Wolk and Briggs, 1975). And it is within this distinction that the relationship between practitioners and researchers appears to be perceived; about which there is the most obvious concern; and from which the explanatory conclusions of this paper are reached.

### *Practitioners and Researchers*

The typical prescription by writers of the relationship between the practitioner and researcher in accounting is that they should cooperate with respect to research, that is, that they should work together over researchable matters; the practitioner being knowledgeable about the problems, and the researcher being skilled in the processes of resolution (a view to be found in, for example, Barden, 1975; Davidson, 1968; Flamholtz, 1979; Flint and

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[2] There are many ways of distinguishing research activity—for example, a priori theorising (including model and hypothesis construction) and empirical observations (including the testing and validating of models and hypotheses); basic 'new frontier' research and applied developmental research; and normative and positive research. The domain of research can also provide a distinction—that is, between the 'social' (including anthropological and behavioural studies) and the 'technical' (concerning the specifics of accounting practices and systems). Many of these distinctions are crude—they are imprecise, and the definitions involve overlappings—for example, positive research depends on normative prescriptions (Whittington, 1987, p. 329). For purposes of this paper, however, the intention has been to make the distinctions as broad as possible as this appears compatible with the thinking and observations of most of the other writers cited.

[3] Each of these broad categories can involve the different approaches and methodologies mentioned in footnote 2. For purposes of this paper, they are labelled for convenience as, respectively, *short-term* and *fundamental* research.

Shaw, 1981; Mautz and Gray, 1970; Miller, 1977; Shaw, 1984; Stamp, 1985; Sterling, 1973, 1988b; Tricker, 1975, 1979; Zeff, 1972). This desire for a unified effort in research can be interpreted as a logical extension of the previously mentioned general prescription of the interdependence of practice and research in accounting.

The need for this partnership between practitioners and researchers has been articulated in a variety of ways other than in terms of a separation of skills. For example, Flint and Shaw (1981, p. 141) suggest that there is a danger of perpetuating accounting problems in practice if research into their resolution is left to practitioners. And Sterling (1973, p. 52) believes there is a need for a unified front between practitioners and researchers in order to counter the resistance of managers to accounting reforms.

The potential success of cooperation is seen by commentators as being dependent on good communications and a continuing dialogue between practitioners and researchers (see Flint and Shaw, 1981; Mautz, 1978; Shaw, 1984; Tricker, 1975, 1979; Tweedie, 1984; Werner, 1978; Zeff, 1972; Zeff and Hofstedt, 1974). The particular need for practitioners to understand the aims and methodology of research has been emphasised by some writers (for example, in Flint and Shaw, 1981; Zeff, 1972; Zeff and Hofstedt, 1974). Indeed Sterling (1973, p. 52) has recommended the teaching of research results in professional education programmes in order to create such a climate of understanding. This appears to be a view also shared by other discussants of the problem (for example, AAA, 1986; Beaver, 1984; Chambers, 1967, 1968, 1972). Other writers have pleaded for either the work of researchers to become more understandable to practitioners (Mautz, 1978; Werner, 1978) or for some means of filtering the results of research to the practitioner (Dopuch, 1978).

The consistent prescription, therefore, is for a working relationship between practitioner and researcher, founded on a mutual understanding and shared interest in researchable problems. Hopwood (1988, pp. 19–20), for example, portrays it with respect to policy-making as the use of an institutional research interface between the accounting profession and the state, allowing the former to respond to the regulatory pressures of the latter.

However, contrary to the above conception of a unified profession, some literature discussants appear to specify the recommended cooperation as including only research of the short-term practical problem-solving type. In other words, they believe that the practitioner and researcher should limit their 'partnership' to those issues of an *ad hoc* nature which meet the immediate operational needs of the practitioner; and that the long-term fundamental research issues should be part of an independent research function (see Flint, 1980; Flint and Shaw, 1981). Indeed, it has even been specifically argued that, because of the expertise and skills required in research activity, all such work should be left to researchers by practitioners (Chambers, 1972, p. 160). But these alternatives to the typical prescription of unified effort raise a question about the degree to which the 'separated' research activity could influence the practitioner, and change and shape his practices. This is a matter that will be discussed later in the paper.

### *Perceived Relationship*

The previous sections have indicated a reasonable unanimity of thought amongst writers on the concept of a relationship between practice and research in accounting. They prescribe an interdependence between practice and research with the predominant emphasis on the practitioner's need for the work of the researcher to solve problems and set policy. These views suggest that the accounting research function cannot be interpreted solely in terms of the profession's search for social respectability. It appears also to be perceived as something that is of benefit and importance to the work of the accounting practitioner, that is, its potential is viewed as also functional and utilitarian.

However, when writers on the subject observe the relationship between practitioners and researchers in operation, they perceive a working situation that is much removed from that which they prescribe. Far from a cooperative effort with good communications, a considerable gap is believed to exist between the practitioner and the researcher, that is, a gap in *thinking* in which the relevance of research activity is questioned by practitioners, and the apparent inability of research results to change practice is a matter of concern to researchers (see, for example, Abdel-khalik, 1983; AICPA, 1978; Barden, 1975; Baxter, 1988; Flamholtz, 1979; Flint, 1988; Flint and Shaw, 1981; Mautz, 1978; Sterling, 1973, 1988b; Tweedie, 1984; Werner, 1978; Zeff, 1972, 1974; Zeff and Hofstedt, 1974). The gap is variously stated by commentators to be ever-widening (Baxter, 1988; Flamholtz, 1979); irreversible (Baxter, 1988); the cause of serious tensions between practitioners and researchers (Abdel-khalik, 1983; Flint, 1988; Previts, 1984; Wolk and Briggs, 1975); the origin of different realities being used for purposes of accounting practice and research (Sterling, 1988a, 1988b); and the potential cause of a diminution in the utility of accounting education (Mautz, 1978).

The main reason for the gap is believed to be a lack of communication between the practitioner and the researcher, despite the prescribed desire for interdependence and cooperation (see, for example, Baxter, 1988; Flint and Shaw, 1981; Mautz, 1978; Mautz and Gray, 1970; Shaw, 1984;

Tweedie, 1984; Werner, 1978; Wolk and Briggs, 1975; Zeff, 1972). In essence, most practitioners are believed by these writers not to understand the aims, methods and results of much of the work of the researcher, and most researchers are thought not to be concerned with the needs of practitioners.

But arguments about the lack of communication between the two groups may not provide the full answer to the perceived gap. At least part of the reason for the problem has been suggested by Baxter (1988), Tweedie (1984) and Wells (1987). They individually propose that it could be due to a dichotomy that exists between the short-term, *ad hoc*, problem-solving needs of the accounting practitioner (which focus on fine tunings of practice through short-term research) and the career concerns and interests of researchers (which make fundamental research a more relevant and necessary proposition for them). Both groups appear to be served by *self-interest*. Practitioners need immediate results from short-term research. And researchers are anxious to advance their careers by building research and publication reputations, and impressing research journal editors and reviewers with complex fundamental research activities. In these circumstances, it should not be surprising to perceive a gap between practitioner and researcher, and it is consequently difficult to envisage the achievement of the close working relationship that has been prescribed by so many writers as the desired state.

It is also relevant to mention that the very nature of fundamental research causes its relevance and consequences to be speculative, tentative and long-term. Thus, it can be argued that the apparent lack of influence of much research on education and practice may be due to the long gestation period involved—a point made explicitly by Anton (1978, p. 36) but apparently largely missed by most other commentators on the specific distinction between short-term and fundamental research.

### *Actual Observations*

Several writers have commented on the considerable size of the gap that they perceive to exist between practice and research in accounting (for example, Baxter, 1988; Flint, 1988; Tweedie, 1984). Hopwood (1988), however, has argued in sufficient detail to caution that this view is exaggerated and oversimplified. In particular, he supports his case of the shared interests of practitioners and researchers with examples of a growing institutional interest in research related directly and indirectly to accounting policy-making. But this appears to ignore the issue of other major research efforts that, as later paragraphs will explain, are perceived to have been largely ignored by practitioners.

One view of the actual relationship between practice and research in accounting is of a research function that is of use to the practitioner only when its results match his immediate needs (Hicks, 1972). This is supported by researched evidence of the development of an accounting model that is congruent to practitioner needs (in, for example, Birkett and Walker, 1970; Flamholtz, 1979; Stamp, 1985; Tricker, 1979); and that can be used to describe, explain and justify current practice (see, for example, Gaffikin, 1987; Henderson and Peirson, 1978; Hopwood, 1988). Watts and Zimmerman (1986, p. 344–5) conclude that this is the use of research as a means of excusing practice.

Actual research activity appears to writers such as Birkett and Walker (1970) and Hopwood (1988) to be a major means by which accounting practitioners attempt to gain public acceptance of their standards. Beaver (1981) has argued in detail that such research has improved accounting regulation in the form of a revolution in standards and disclosures in financial reporting. But other writings reveal clear and contradictory evidence of a continuous recycling of financial accounting issues (see, for example, Brief, 1975; Lee, 1977, 1979, 1983; Mumford, 1979; Solomons, 1987; Sterling, 1979); and the use of management accounting practices that are not relevant to the organisational functioning they are intended to describe (see, for example, Kaplan, 1986; Staubus, 1987). Dyckman and Zeff (1984, pp. 256–9) have provided specific evidence of the apparently diminishing influence of the research-based journal literature on practice developments in, for example, standard-setting (they also reveal, at pp. 250–1, the lack of practitioner involvement in research-based journals such as the *Journal of Accounting Research*).

The major problem in this respect appears to be that perceived by Sterling (1973)—the apparently persistent ignoring or rejection by practitioners of the results of predominantly fundamental research—particularly that which has the propensity radically to change existing practice. The history of this process of rejection is gradually becoming available (see, for example, Flamholtz, 1979; Previts, 1984). And several writers have been able to conclude from their specific investigations that fundamental research has had no significantly measurable impact on accounting practice in terms of changes to the latter (Bedford, 1978; Dyckman, Gibbons and Swieringa, 1978; Henderson and Peirson, 1978; Hopwood, 1988; Mautz and Gray, 1970; Staubus, 1975; Zeff, 1972, 1974).[4]

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[4] A word of caution is important to the reader at this stage. The rejections which are being described have to be related to the definitions and explanations in footnotes 2 and 3. They do not refer to the rejection of all research or, indeed, of abstract knowledge. What they do relate to is the relationship of the research to the immediate problem—if the results 'solve' the latter (or are at least helpful), they appear to be accepted (used); if they do not, they appear to be ignored, rejected or set aside. Most fundamental research falls into the latter categories.

But, as Hopwood (1988, pp. 16 and 18) argues, accounting practitioners, at least as expressed through the activities of their professional bodies, appear to desire that fundamental research be undertaken on their behalf when the occasion suits, even if its results are subsequently rejected, ignored or set aside; the commissioning appearing to be as important as the implementing. Such conflicting behaviour by accounting practitioners is difficult to explain or justify. It happens and can be evidenced. It cannot be as easily understood. It may be the result of the profession desiring to maintain its social credibility and status by being seen to address serious long-term issues requiring research. Alternatively, it may assist in explaining the continuous recycling of accounting issues. It may also be the cause of the continuous frustrations and tensions between practitioners and researchers. However, it does not appear to reconcile with the optimistic view of Wells (1976) that the fundamental a priori research activity of the 1960s and 1970s is indicative of a Kuhnian revolution in progress, that is, competing schools of accounting thought that will eventually result in a dominant one that will (presumably) influence and change accounting practice. Nor does it appear to support the equally optimistic and more specific conclusion of Moonitz (1978, p. 43) that the interaction of research and practice in relation to the price-level problem has been fruitful; or of Davidson (1978, p. 206) that much practical progress has occurred as a result of research.

### *Reasons for the Gap*

Various reasons have been advanced for the perceived gap between practice and research in accounting. Tweedie (1984) provides a useful summary in terms of identifiable differences in research goals, researchable issues, and the timing of researched solutions. The net effect is what Zeff (1972, p. 138) has stated as a mutual lack of appreciation, and what has been described frequently and more generally as a lack of communication (see, Abdel-khalik, 1983; Baxter, 1988; Flint and Shaw, 1981; Mautz and Gray, 1970; Shaw, 1984; Tweedie, 1984; Wolk and Briggs, 1975). In particular, Mautz (1978, pp. 178–80) has condemned researchers for their inability to communicate on research issues with practitioners. And Werner (1978, p. 187) suggests that fundamental research will be given a 'fair chance' by practitioners only if presented to them in a form which is interesting, readable and understandable.

The perceived gap is far distant from the prescribed interdependence and cooperation. The reasons advanced for such inconsistency are complex and speculative. They have been proposed by a number of writers, and relate mainly to perceptions of the different attitudes of practitioners and researchers to the nature and role of research. The result would appear to be that each group is perceived by commentators on the issue as having different criteria for judging the relevance and the success of research. Practitioners (faced with immediate practice problems) are stated to be concerned more with the short-term and the practical; and researchers (faced with career strategies) more with the long-term and the abstract. Perhaps this can be best expressed in terms of *perceptions of self-interest*. Practitioners are believed to have a need to fire-fight their practice problems but no deep-down urge to change practice—merely to justify it when called upon to do so. And, as argued by Dopuch (1978, p. 208), researchers are thought to have little career incentive to become involved in research with practice implications and potential.

In addition, it has been argued by writers such as Flint (1988), Sterling (1973) and Zeff (1972) that, for the accounting practitioner, there is a distinct lack of research *tradition* to encourage him to seek help from the researcher and, perhaps less frequently, encourage the latter to research new accounting technologies. It is therefore hardly surprising under these circumstances to conclude that there are differing perceptions of expectations with respect to the research function in accounting, and that there are comments about the lack of understanding by practitioners of the aims of accounting research (see Mautz and Gray, 1970; Miller, 1977; Zeff, 1972) and its methodology (see Zeff, 1972; Zeff and Hofstedt, 1974).

A further reason for the perceived gap has been proposed by Chambers (1966), Previts (1984) and Sterling (1977). It is argued by these writers that accounting practitioners are conditioned by the habits of thought which are passed on through successive generations. This tends to make it difficult if not impossible for practitioners to accept knowledge other than that with which they have been habituated or conditioned to (in recent times through formal education programmes). This is what Sterling (1988a, p. 17) describes as trained incapacity in accounting—an inability, because of previous education and experience, to accept alternatives to the accepted conventional practices. It may be the cause of a number of problems identified by commentators—for example, practitioners and researchers recognising different realities for purposes of practice and research (Sterling, 1988a, 1988b); failures in identifying and stating adequately research problems (Mautz and Gray, 1970; Sterling, 1979, 1988a, 1988b); and even accounting researchers researching non-accounting domains (Christenson, 1983; Sterling, 1988a, 1988b; Whittington, 1987).

A final explanation of the perceived gap is worthy of some comment. This relates to events in the world of financial accounting in recent decades in which the end-user of such accounting is no longer the predominant concern of accountants. Instead, the pressure is on ensuring that the preparer's requirements are complied with in reporting and, in these circumstances, the need is for a sufficiently flexible accounting to accommodate such client satisfaction. Research could upset this objective by providing explanations, justifications and solutions contrary to the self-interests of the accountant and his preparer client. This may well explain the concerns over the extensiveness of so-called creative accounting (Briloff, 1972, 1976; Griffiths, 1986), the reduction of financial accounting to a game of rules (Gerboth, 1987), and the lack of intellectual leadership by practitioners on accounting issues (Zeff, 1987). In other words, the practitioner is 'trapped' by his self-interest and is unable to respond or react to the results of research.

In addition, it can be argued that the above situation is not assisted by the lack of action of legislators and regulators on the issue of the need for change in accounting. In the UK, neither legislators nor standard-setters appear to have upset the predominant role of historical cost accounting in financial reporting (Tweedie and Whittington, 1984) and, in the US, a similar indictment can be made with respect to the Financial Accounting Standards Board and the Securities and Exchange Commission (Kripke, 1979). Thus, an inherent reluctance to change by government, in its widest sense, can be perceived to have acted as a barrier to practitioner responses to research results in accounting—irrespective of any desire by practitioners and researchers to co-operate to improve the state of accounting practice through research.

### *Perceived Solutions*

For whatever reason, a gap is believed to exist between the practitioner and the researcher in accounting. Whether it *actually* exists is not the issue. Contributors to the relevant accounting literature perceive its existence, and have felt strongly enough about it to comment in detail on its 'shape' and consequence. The above analysis suggests that the practitioner and the researcher are both believed to be interested in research, but different needs are seen to demand different types of research.

Despite these differences, the common solution to the gap is an explicit or implicit commitment to bridge it (see, for example, Abdel-khalik, 1983; AICPA, 1978; Dopuch, 1978; Flamholtz, 1979; Flint and Shaw, 1981; Mautz, 1978; Sterling, 1973; Sterling, 1988a, 1988b; Tweedie, 1984; Zeff and Hofstedt, 1974). The specifics of this solution are usually articulated in the relatively vague terms of achieving either a working partnership or better communications—matters which are prescribed as part of the desired relationship between practitioners and researchers (for example, by Barden, 1975; Davidson, 1968; Dopuch, 1978; Flamholtz, 1979; Flint and Shaw, 1981; Mautz, 1978; Mautz and Gray, 1970; Miller, 1977; Shaw, 1984; Stamp, 1985; Sterling, 1973; Tricker, 1975, 1979; Werner, 1978; Zeff, 1972). Only a small minority of the commenting writers have suggested that the gap should be left alone (for example, Baxter, 1988; Chambers, 1972; Wells, 1976). As previously mentioned, Chambers (1972, p. 160) has proposed that practitioners should vacate the field of research.

A more specific proposal to assist in the unification of the practitioner and the researcher in accounting is the use of the education function—to teach the results of research, and thereby provide practitioners with an appreciation and understanding not only of the role of research but its benefits in practice (see, for example, AAA, 1986; Abdel-khalik, 1983; Beaver, 1984; Chambers, 1967, 1968, 1972; Staubus, 1975; Sterling, 1973; Tweedie, 1984; Wolk and Briggs, 1975). In this way, the closing of the gap between practice and research is believed to be possible by the linking of research to education. A triangular relationship would be formed in which the profession of accounting would exist as a unification of education, practice and research. This is a matter that will be examined further in the following sections.

## Education and practice

The relationship between education and practice in accounting has been discussed comparatively infrequently in the literature of recent times. This is surprising considering the importance of the education function to the accounting profession. It is the means by which the quantity and quality of its practitioners are maintained, and is therefore crucial to its long-term survival. Larson (1977, pp. 210–11), for example, has described the legitimising of the education process, with the ability of a professional to sell his skills and create social inequalities. The literature contributions that are available, however, reveal matters of concern that appear to parallel those affecting the practice and research relationship. As such, they cast doubts on the feasibility of the proposal to integrate the results of accounting research into accounting education programmes.

### *Professional Needs*

Views about the relationship between education and practice in accounting are typically expressed in normative terms. In particular, they are prescriptions that reflect the postulated needs of the accounting profession and its practitioner members. More specifically, the needs prescribed are for educated professionals to cope with a rapidly changing world (see, for example, Chambers, 1967, 1968; Staubus, 1975); education programmes that are capable of providing explanations and an understanding of alternative accounting systems and technologies, and that reduce practitioner resistance to change (see Staubus, 1975; Sterling, 1973); education programmes that are broad and innovative rather than narrow and traditional (see AAA, 1986; ICAEW, 1986 and 1987; Langenderfer, 1987; Lothian, 1986; Staubus, 1975; Sterling, 1973); and, particularly in the context of this paper, education programmes that integrate the results of research into the classroom (see AAA, 1986; Abdel-khalik, 1983; Beaver, 1984; Chambers, 1967, 1968, 1972; Staubus, 1975; Sterling, 1973; Tweedie, 1984; Wolk and Briggs, 1975).

*Relationship Specifics*

The above prescriptions of an education and practice relationship in terms of the needs of the accounting profession are compatible with the corresponding prescriptive statements concerning the practice and research relationship. They also appear to support further the interpretative theses advanced by Montagna (1974) of the accounting profession attempting to exercise power by control over the areas of uncertainty in practice; and by Hopwood (1988) of the profession being given authority by legitimating its institutional role—in this case, by means of education programmes that are capable of providing the profession's entrants with the body of knowledge required to monopolise accounting practice and sustain it with public credibility and acceptability. More specifically, it is consistent with a newly emerging researched interpretation of the role of accountants in society—that accounting practitioners maintain their social rewards and status by means of institutionalising the accounting education process (see Richardson, 1988).

Richardson's work supports the general hypothesis of Larsen (1977) that professions attempt to maintain their position of monopoly by controlling the training and education processes that provide the skills and knowledge required in practice. It is also consistent with the specific recommendations of Langenderfer (1987, p. 329) that educators become more involved in the work of practitioners and their professional bodies; and of Wells (1987, p. 17) that there is a need for practitioners to become more involved in the educational (and research) activities of the accounting profession. However, it is also of interest in this context to find writers advocating the contrary—that accounting education should be the specific responsibility of universities and colleges *independent* of the profession, and that the latter's responsibility should be limited to training (see, for example, Chambers, 1972; Wells, 1987). In particular, educational leadership and an intellectual tradition in accounting matters are seen by some writers as the primary role of universities and colleges rather than of the profession (Chambers, 1972; Flint, 1980, 1988). Zeff (1989) makes a particular plea for avoidance of the consequences of university and college-based education becoming more dependent on professional practice requirements.

*Educators and Practitioners*

The prescribed need of the accounting profession for flexible and innovative education programmes; the broad perception of the profession controlling such programmes to consolidate its societal position; and the specific advocacy of education devolved to independent institutions, present a seemingly confused normative picture of the education and practice relationship in accounting. However, some clarification can be found in the perceptions of the current state of a number of recent commentaries on the subject.

The American Accounting Association (AAA, 1986, p. 172) included in a recent detailed report on US accounting education a statement that it believed a distinct gap existed between education and practice—the former relating mainly to a rote learning of traditional accounting techniques, and the latter requiring a much more liberal approach and knowledge than was currently provided in accounting education programmes. This view has also been supported in Scotland by Lothian (1986) following a researched investigation of business needs and accounting education; and in England by the Education and Training Directorate of the ICAEW (ICAEW, 1986 and 1987).[5] More specifically, Wells (1987, p. 17) suggests that accounting educators are too preoccupied with satisfying the short-term needs of accounting practitioners for technical accounting skills, with insufficient attention being paid to the longer-term needs of the wider economic community. And Zeff (1989, p. 168) warns that increasing accreditation could cause the emphasis on recommended practice to supersede the alternative educational perspective of liberal accounting education programmes. In other words, accounting educators are perceived as not providing the type of accounting education that is required for practitioners of the future.

These observations are supported by arguments concerning a discernible lack of integration of the results of research into accounting education programmes (see, for example, Staubus, 1975; Sterling, 1973; Wells, 1987). The typical observation in this respect appears to be that such programmes are mirror images of conventional practice, and provide little space for a consideration of alternative explanations, practices and thinking. And several writers have complained at length of the failures of educators to question conventional practice (for example, Chambers, 1967, 1968, 1972; Staubus, 1975).

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[5] The position in England and Wales is of considerable interest at the present time. Having maintained a position of reasonable independence vis-à-vis accreditation, the pressure on universities and colleges is now for greater control by the profession through accreditation in return for increased exemptions to students from professional examinations (ICAEW, 1987).

### *Actual Observations*

Actual observations of the current state of accounting education appear to provide a picture that is compatible with the perceptions and arguments in the previous sections. The American Accounting Association (AAA, 1986, p. 172) has found the typical US accounting curriculum of the 1980s to be little different in content and intention from that of the 1930s. Gaffikin (1981, p. 33) has observed a consistent commitment in the New Zealand curriculum to immediate professional needs, and has discussed the restrictions in innovation in the educational programmes offered to would-be practitioners due to professional prescriptions. Zeff (1979, p. 593) has complained of the lack of theory in the US accounting curriculum; and (Zeff, 1989, p. 165) of the lack of theory in textbooks. Cherry and Reckers (1985) have confirmed Zeff's review but concluded (p. 138) that a majority of the US educators surveyed appear to support the view that no change is required in the present content of accounting courses.

Zeff (1989) draws together certain of these observations in the US context, and warns against the position translating to countries such as the UK. He particularly analyses (pp. 160–8) the proliferation of accounting standards, the impact of this on the content of textbooks and examination syllabuses, and the apparent willingness of educators to accept the narrowing of the education programme to meet specific practice needs. Such a restricting process can be evidenced recently in the UK—by an increasing desire in Scotland strictly to accredit education programmes in universities and colleges (Black, 1987); and by an obvious desire by accounting firms and the ICAEW to act similarly (even in the context of a more liberal syllabus) (ICAEW, 1988).

In addition, Langenderfer (1987) outlines the historically long-standing and close involvement of practitioners in US accounting education programmes. He particularly (pp. 318–24) describes the more recent history of professional accreditation—establishing the common body of knowledge of accounting, recognising the need for schools of accounting, and determining enforceable education standards. Of special interest to this paper is the account (pp. 322–4) of the determined but so far unsuccessful attempt of the main professional body (AICPA) to obtain responsibility for the accreditation process, and its continuing desire to establish professional schools of accounting.

The apparent willingness of accounting educators to be part of professionally controlled programmes is evidenced in the US by Brown and Balke (1983) and Lentilhon and Krzystofik (1983). The gradual increase during the 1970s and 1980s in the number of schools of accounting based in universities and colleges to accommodate such programmes in the US is revealed by Williams (1984). Such a movement is not evident in the UK but, increasingly, the educational programmes of UK universities and colleges are being monitored in detail and accredited accordingly, for example, through the work of the Board of Accreditation of Educational Courses which reviews course structure, content, assessment, and educators.

The picture, therefore, is one of the accounting profession, through the mechanism of its professional bodies, increasingly controlling its education function directly by means of the prescription of syllabuses and related examinations that match the perceived current needs of practice; and continuing its attempts to exercise such direct control in situations where this is presently not the case. Research, especially of a fundamental nature, appears to have little part to play in an educational process that is becoming increasingly crowded because of the expansion of subject content related to practice requirements. There is also some evidence of difficulties and tensions that can emerge between the educator and the practitioner in such situations (Gaffikin, 1981).

### *Perceived Solutions*

The above sections indicate that, contrary to the prescriptions of certain writers, research is seen by many observers to appear to have little part to play in an educational process which is geared increasingly to the current needs of accounting practitioners. As such, these relationships can be described in the form of a closing loop that involves accounting education and practice but which appears to exclude much of the results of research (particularly of a fundamental nature). The major issue is the significance of the role of such research under these circumstances.

There have been few solutions perceived with respect to this dilemma. Several writers have implied a need or argued for broader, more innovative education programmes (for example, AAA, 1986; Langenderfer, 1987; Zeff, 1989); or for programmes which are more relevant to industrial and commercial needs rather than public practice (Lothian, 1986). Black (1987) explains how one major professional body has responded to the latter suggestion with a somewhat broader professional education including management subjects. And the ICAEW Education and Training Directorate (ICAEW, 1987 and 1988) has made apparently similar responses in England and Wales.

Langenderfer (1987) and Wells (1987) have suggested that educators and practitioners should become more involved in each other's function.

But, given the present consequences of their past involvement, this would not appear to be a process that suggests any substantial change with respect to the place of research in the classroom. This leaves one further suggestion already mentioned in relation to the practice and research link—to teach the results of research alongside the conventional wisdoms of accounting practice (see, for example, AAA, 1986; Abdel-khalik, 1983; Beaver, 1981, 1984; Chambers, 1967, 1968, 1972; Staubus, 1975; Sterling, 1973; Tweedie, 1984; Wolk and Briggs, 1975).

The most detailed arguments with regard to this suggestion are those of Sterling (1973). In his paper, he argues that the loop between education and practice in accounting has isolated accounting research so that it cannot be integrated into education programmes or assist in changing practice. His solution is to use the teaching of research results in the classroom to reduce practitioner resistance to alternatives to the conventional practice. However, since 1973, there is evidence (described above) to suggest that the closure tendency of the loop between education and practice may have been accentuated by the increasingly detailed accreditation of accounting degrees and the existence of educators in schools and departments of accounting apparently willing to implement accredited programmes that meet strict practice requirements. The consequences of this present position require to be examined.

## Consequences

The consequences of the uneasy relationship which accounting research appears to have with practice and education have been explored by a number of writers in recent times. The most obvious effect is that accountants can never regard themselves as capable of providing accounting information which allows its users to act and choose knowledgeably and with freedom. Irrespective of the alternatives available to them, they will always provide information within a static, conventional and much criticised framework of practices (see Chambers, 1967, pp. 25-3). Several researchers have demonstrated the chain-reaction effect of this fundamental problem.

First, as Chambers has argued on many occasions (for example, in Chambers, 1968), there is a failure to eradicate defects in accounting practice with a consequential stockpiling of methods. Equally, there is a failure to change the body of knowledge of accounting when organisational circumstances merit it—a point extensively argued in relation to management accounting by Kaplan (1984, 1986, 1988) and Johnson and Kaplan (1986). There is also the problem previously mentioned of the recycling of accounting issues—best evidenced in relation to financial reporting matters such as allocation and income calculation (see, for example, Brief, 1975; Lee, 1977, 1979, 1983; Solomons, 1987; Sterling, 1979). Indeed, the problem can be evidenced in terms of specific cycles of events that trigger the initial investigation and the subsequent rejection (Dailey, 1984; Mumford, 1979).

The apparent failure of research to have a substantial impact on accounting practice does not mean that no specific changes in practice have been or are possible. In fact, historical studies suggest that the opposite can be true, that is, that, despite the *overall* lack of influence of accounting research, the detail of accounting practice can be changed. In particular, non-accountants can be shown to be the cause of change (as with nineteenth century engineers in relation to cost accounting: see Wells, 1977); or regulators can introduce change when it is believed to be societally necessary (for example, early twentieth century disclosures in financial accounting: see Aranya, 1974; Edwards, 1976). But the overall impression remains that, despite many changes in specific practices, the overall body of conventional accounting knowledge (that is, its major aims and its consequential principles) appears to have remained intact over many decades.

Nor should it be assumed that the apparent failure of fundamental research to change existing accounting practice necessarily mean that all such research is serving a 'neutered' role. In recent years, there has been a growing recognition of the importance of *anthropological* research to observe and explain the consequences of existing accounting practices in different organisational environments (for example, markets-based research: see Watts and Zimmerman, 1986; and historical research into organisational effects: see Hopwood, 1987; Hoskin and Macve, 1986, 1988). However, it remains open to question and research as to whether such explanations have had an impact on either education programmes or practice.

### *Research Disputes*

There is also evidence of tension building up between researchers as suspicions about and lack of respect for each other's work increases—in large part due to the lack of impact of research on practice. Zeff (1989, pp. 169–72), for example, comments on the growing denigration of normative and historical research, the rise in interest in quantitative research methodology, and a related switch in emphasis to empiricism at the expense of normative studies. Specific evidence of these changes is to be found in the Dyckman and Zeff (1984) review of the development of the *Journal of Accounting Research.* In particular, the lack of impact on accounting practice of normative research in the 1960s and 1970s appears to have created a strong reaction in the form of positive accounting research (evolving from earlier efficient markets and agency theory research: see Watts and Zimmerman, 1979, 1986).

The major objective of positive accounting is to explain and predict accounting practice (Watts and Zimmerman, 1986, p. 2). Its benefit is stated to be its assistance to accounting policy-makers in determining the consequences of their decisions (p. 14). It has no intention to prescribe accounting practice (p. 7). In contrast, normative accounting theory is stated by the positivists to be dependent on user demand for prescriptions (p. 9).[6] In other words, the approach of positive accounting research is to observe behaviour in relation to the operation of specific accounting technologies—what Sterling (1970, 1988a, 1988b) describes as accounting anthropology.

As such, it is dependent on existing accounting practice, and does not seek, as a matter of priority, to change it.[7] Consequently, because of the aforementioned mutual dependence of accounting education and practice, positive accounting presumably does not seek primarily to influence education either. The conclusion must be that positive accounting research has the propensity to maintain the loop of education and practice in accounting. It does not challenge directly the utility of these functions, and can be argued to legitimate them. In addition, it has the potential to disrupt the accounting research community, particularly with respect to altering the catholic mix of research approaches and ideas which are usually associated with such a grouping (Zeff, 1989).

*Recycling of Issues*

A further effect of the current situation can be advanced. As previously mentioned, the recycling of accounting issues and the lack of change in accounting practice can be argued to be due to the failure of fundamental research to influence education and practice. But an alternative view of this situation is to suggest that the natural habits of thought and trained incapacity of accountants that maintain the practice status quo are accentuated by the absence of a substantial research influence in the classroom.[8] In other words, without the significant presence of fundamental research in accounting education programmes, habits of thought are not altered and trained incapacity is strengthened. Indeed, as Sterling (1988a, 1988b) has demonstrated, accounting appears to have been reduced to numerology, that is, the figures produced have no apparent meaning other than in terms of the accounting rules used to calculate them. The fault is perceived by Sterling (1988a) to be in the teaching of accounting. He believes that accountants are taught ritualistic rules rather than how to prepare accounting representations of economic reality. This can only be exacerbated by the situation suggested by Zeff (1989) that much research of a normative or historical nature appears to be excluded from the training of many educators in favour of methodology driven research with its emphasis on empiricism generally (and positivism particularly).

## A synthesis

At this stage in the paper, it is useful to attempt to draw together the main points to be evidenced from the foregoing reviews of the relevant literature, before proceeding to seek explanations. The first conclusion is that the contributions concerned are a mixture of prescription and observation, with the predominant emphasis on prescription and perception. There has been surprisingly little empirical fact finding undertaken. The main prescriptions are of research and education existing to meet practice and practitioner needs. Research is seen as providing rationales for existing practice (rather than being the origin of new practice); and as a cooperative effort between researchers and practitioners (different skills but with common purposes and shared views, and a mutual understanding of each other's function). Education, on the other hand, is seen as a means of maintaining the monopoly of knowledge of accounting practitioners, but advocated as the potential vehicle for introducing the results of research to future practitioners.

The main perceptions of the relationships, however, reveal a somewhat different situation from that prescribed above. There is perceived to be a considerable gap between research and practice (in thinking, needs, communication and understanding). Equally, there is seen to be a gap between education and practice (the former failing to adapt to meet the challenges faced by practitioners). Much of research is perceived to have little direct impact on either education or practice—particularly if it is of the type defined in this paper as fundamental. The overall perception is of a controlled loop between education and practice with much of research activity being excluded from such a functional relationship.

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[6] In response, Whittington (1987) has pointed out (p. 329) the prescriptive nature of positive accounting research, and Sterling (1988a, 1988b) has argued in detail for the scientific basis of normative theorising, and against the lack of science in positive theories.

[7] This is not to suggest that positive research has no part to play with respect to change in accounting practice. Indeed, without studies of the current state of play, it is hard to envisage how normative theories can be contemplated as potential alternatives.

[8] This is not intended as an argument that there is a universal lack of research influence in education. It may well be that in certain situations educators can introduce the results of research to the accounting curriculum. But the overwhelming feeling of the commentators cited in this review is that the overall influence is, at best, small and, at worst, nil.

Actual observations of the functions and their relationships tend to support these perceptions—fundamental research is not perceived as having had a significant impact on practice, and practitioner control over the education (and examination) function also appears to result in the isolation of research. Explanations for the loop of education and practice and the isolation of research can be attempted in terms of differing attitudes and needs, the lack of a research tradition, habits of thought, and a combination of self-interests of preparers and practitioners, and regulators' attitudes to change. The consequences of the situation are seen as the failure of a relatively static education to cope with organisational change, the recycling and lack of resolution of accounting practice problems, potential research frustrations and tensions, and the users of accounting information not being knowledgeably free.

Resolutions of these problems are various. The typical solution to the isolation of research from education and practice is to attempt to bridge the gaps (by better communications and through the education process). Education particularly is seen as the key—the need for broader programmes to cope with change, the inclusion of research results in the curriculum, and the need for greater educational independence from practice and practitioners. But these 'solutions' are prescriptions; and represent normative attempts to operationalise the prescribed relationships of education, practice and research in accounting. They do little to *explain* the perceptions and observations of the relationships which have been commented on in this paper.

## Explanations in conclusion

The above paragraphs and sections have attempted to provide an outline and synthesis of how the relationships between education, practice and research in accounting are prescribed, perceived and observed. The picture is complex because of the variety of comments which have been published. However, there is an overall structure which can be deduced from them. The problem is attempting to explain it. The following sections are a possible agenda for explanation.

### *Magic Accounting*

It is clear from the previous sections that most commentators on the subject wish to see accounting research as part of the profession of accounting. This appears to be the case whether the commentators are educators, practitioners or researchers. The view of a research function with utilitarian and social values is a universal one. But research, particularly of a fundamental nature, is believed to have had little or no impact on practice, and does not seem to have significant potential in the classroom because of the increasing restrictions of professionally accredited and controlled education programmes. The consequences of this position are relatively obvious in terms of the static nature of accounting practice and an increasing interest by researchers in what has been described as accounting anthropology.

Perhaps not surprisingly, there have been persistent criticisms of the manipulatory nature of accounting practice over the years (see, for example, Stamp, 1970; Briloff, 1972, 1976; Griffiths, 1986). The economic meaning of accounting figures has also been seriously questioned (for example, by Thomas, 1974; Sterling, 1979, 1988a, 1988b). Even some accounting practitioners have come to the conclusion that accounting reports and numbers are presently meaningless (McMonnies, 1988). Yet the fundamentals of accounting practice remain intact after many decades of such criticism, and its practitioners have a considerable social status which is rewarded accordingly. As many writers have argued and demonstrated, the process of accounting has become a legitimated institution in society (Chambers, 1966; Gambling, 1978; Hopwood, 1988; Richardson, 1987; Scott, 1973). And it has secured a monopoly position in accounting for its practitioners by their attempted closure of the system by control over the accounting education and examining process (Richardson, 1988).[9]

Gambling (1977, 1978, 1987) has attempted one explanation of this situation in which the body of knowledge of accounting remains intact and valued in the closed loop of education and practice. He describes it as magic accounting: a societal assenting to the body of knowledge by institutionalising it despite its faults. He believes that this community approach to accounting avoids serious conflict and maintains confidence in accounting practice. It is a means by which organisations in society cope with uncertainty. Accounting becomes an organisational comforter despite the lack of meaning in accounting figures. In other words, this is a societal role for accounting that cannot be explained in scientific terms. It does not seek absolute truths. Nor are accounting figures necessarily concerned with conformity to any form of economic or organisational reality. Gambling (1978) perceives human satisfaction or the need to serve civic ends as the objective of accounting in these circumstances, that is, what he believes to be accounting's capacity to provide long-term customer satisfaction (Gambling, 1987).

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[9] This should not be interpreted as indicating that accountants have a monopoly over all the services they offer. This is clearly not the case with respect to management services generally, but is the case in much of the traditional areas of accounting, auditing and taxation.

*Fundamental Research*

But an explanation of accounting solely in terms of a socially valued but otherwise meaningless ritual does not appear to be a full explanation. For example, it does not help to determine or explain the role for accounting research in this situation of professional closure—particularly, the role for its long-term fundamental variant. Such research exists, and many individuals appear to value it. Even professional accountancy bodies have commissioned it (but then rejected, ignored or set aside its findings).[10] Such apparently schizophrenic behaviour deserves some deeper explanation.

Fundamental research findings have the *potential* to explain, challenge and replace conventional accounting practice. They represent, in large part, prescriptions, predictions, explanations and justifications for the use of alternative accounting technologies that may be more relevant to organisations and individuals than the existing conventions of practice. But conventional accounting practice appears to be strong enough to withstand such challenges. It is a legitimated institution in society, and it is the product of a continuous historical process which has layered the conventions of practice through the activities of successive generations of accountants. It is operated by a socially respected profession of practitioners which has a monopoly of complex accounting and related technologies (involving judgments) through controlled education and training processes. And it provides these practitioners with the means of obtaining considerable social rewards and status. To these practitioners, fundamental research could be seen as either irrelevent or threatening: irrelevant because conventional practice is working and rewarding despite its inherent faults; and threatening because of the potential to disrupt the position of stability created by the conventional practice. At the very least, change could be perceived by practitioners to be not economical. In other words, the impact of self-interest vis-à-vis practitioners should not be under-estimated in this context.

Yet research is apparently a desired function in accounting—not only by those commentators who have argued for its place within a unified accounting profession but also by professional bodies and firms of practitioners who commission, sponsor and fund research (including fundamental research). The need for short-term *ad hoc* research to fine tune conventional practice is relatively clear—it appears to serve a useful purpose in sustaining such practice. However, an explanation of the need for research of a fundamental nature, and the subsequent rejecting, ignoring or setting aside of it (either in practice or the classroom), is less easy to provide.

Perhaps such research is needed in order to allow the accounting profession to appear to be answering the criticisms and pressures on conventional practice; and perhaps this further legitimates its institutional role in terms of added credibility and respectability. And, for similar reasons, it certainly must assist in the siting of accounting education programmes within independent academic institutions such as universities that have a research tradition in many other subject areas. Thus, there appears to be a *hidden agenda* concerning the world of accounting and its research activities. It may desire research for various legitimating reasons, but accept its findings selectively—arguably because of their potential to alter the well-rewarded status quo.

*Power and Knowledge*

A possible further explanation of this situation can be provided in terms of the interdependence of power and knowledge (as articulated generally and in specific contexts by Foucault, 1970, 1972, 1979, 1980). Accounting practice can be argued to be a body of knowledge which provides accounting practitioners with a considerable capacity to exercise power and authority in the context of governing organisational functioning (see Hopwood, 1987; Montagna, 1974). In particular, practitioners' exclusive knowledge of specific accounting technologies provides them with the potential to monopolise the production of accounting information which is crucial to the management and control of organisations. Maintenance of such a monopoly can be ensured in large part by the close control by practitioners of the educational and examining process (including training). Thus it would appear at least logical to suggest that accounting practitioner monopoly in practice is dependent on the exercising of power by practitioners over the function that provides the body of knowledge necessary for practice.

As previously mentioned, such control over accounting education by the practitioner is to be evidenced in the increasing accreditation process operated by professional accounting bodies, and the need for would-be practitioners to pass examinations determined by these bodies. The closed loop of education and practice, created originally in accounting in terms of a master and apprentice relationship, is maintained nowadays by the approval for professional purposes of accounting education programmes in apparently independent institutions, and the practical examination requirements which follow. In addition, the specified accounting curriculum typically mirrors the practice needs of the accounting profession. This exercising of power by means of the education function maintaining a practice monopoly through provision of practitioners with the knowledge to obtain considerable financial and social rewards is now being researched and more specifically evidenced (see Richardson, 1987, 1988; and also Hoskin and Macve, 1986, 1988).

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[10] Examples of this are not difficult to evidence—in the US, the normative financial accounting studies of Moonitz (1961) and Sprouse and Moonitz (1962), and in the UK, the conceptual framework studies of the ASC (1975) and Macve (1981). On a more specific issue, inflation accounting, Tweedie and Whittington (1984) outline in detail the history of a debate which has persisted for decades and remains unresolved—despite many independent research studies being commissioned and available to accounting policy-makers.

Short-term problem-solving accounting research appears to have the potential to assist in the maintenance of the above position. Its concern with strengthening but not changing the basic structure of existing practice (and, thus also, the dependent education process), ensures that such research constitutes a function within a closed loop of education and practice over which the accounting profession has power. Because of its relative compatibility with conventional practice and education, short-term research is a matter that the profession can explicitly support and in which it can be actively involved. In this context, it can be argued that positive accounting research, because of its explicit anthropological nature, is not an immediate threat to the status quo; it is not intended primarily to change practice. Indeed it may even become valued by the profession because of its propensity to stabilise its education and practice functions.

Much of fundamental long-term research, however, does not appear to be in the closed loop of education and practice. Its findings have not influenced either function, and are continually rejected, ignored or set aside. But they constitute a body of knowledge from which power can be exercised—they have the potential to change radically existing accounting education and practice; and, possibly, to reduce the monopoly exercised by practitioners with its consequent rewards and status. Accounting practitioners thus appear to be faced with a problem. On the grounds of self-interest, they presumably do not wish the present accounting monopoly to be disturbed—thus fundamental research results tend to be rejected, ignored or set aside in relation to education and practice. But equally they do not wish to be seen to be members of a profession without a fundamental research function—to do so may well run the risk of their services not being socially acceptable or credible. In other words, it can be argued they have to be seen to encourage such research but, of necessity, they require to control for the effects of its findings. Such control appears to be exercised by the aforementioned isolation of fundamental research.

The present situation can therefore be explained as one in which the accounting profession is '*managing*' the fundamental research function—by prescribing a desire for it; perceiving gaps between practice and research, and expressing a further desire to bridge them by encouraging research. But, in reality, it does not appear to allow education or practice to be influenced significantly by the results of such research. In this way it can be seen as maintaining the status and legitimacy of conventional practice without fear of having this stability disturbed. It can maintain its power and authority.

### *A Systems Approach*

The above analysis of the relationship of accounting education, practice and research in terms of the twin concepts of power and knowledge allows a further explanatory perspective to be advanced. This involves the adoption of a *systems* view of the issues concerned. In particular, accounting can be regarded as organised activity that falls within the usual definitions of systems—that is, involving elements relating to one another in some form of pattern within a defined whole (see, for example, Kast and Rosenzweig, 1976, p. 15; and Beer, 1979, p. 7). As an organisation, the world of accounting can be regarded as an open system, relating and adapting to its environment in order to remain stable (Kast and Rosenzweig, 1976, p. 19). And, as an open system, it is subject to the tendency of *closure*—the self-referencing process that assists in identifying the system and maintaining its viability (Beer, 1979, p. 260). Closure is a systems device for control in the management of its internal and external relationships.

In terms of its education, practice and research relationships, the evidence of this paper is that accounting as a social system appears to be exercising such control through closures. Education and practice are in a tightly controlled loop, and research is situated largely outside that loop. The identity of accounting appears to have been determined by the drawing up of these boundaries. Excluding much of the consequences of research activity from the loop prevents the system from being broken down. The education and practice relationship is an example of what Beer (1979, p. 260) describes as the snake eating its own tail.

Thus, proposals deliberately to site the results of research in the classrom appear doomed to failure so long as the accounting profession maintains its control through closure of the loop of education and practice. An alternative approach is to recognise the power of research being sited outside this loop (that is, in the form of alternative bodies of knowledge) and to use the independence of educational institutions to teach the results of such research to as wide an audience as possible. It is a suggestion which appears to counter the current danger of normative accounting research being lost because of the unwitting 'alliance' between practitioners maintaining their monopoly in the loop of education and practice, and many researchers being content to study the anthropology of that loop. To be influential, it can be argued that accounting research requires an independence from the accounting profession. Otherwise, there is the danger that magic accounting may well prevail indefinitely and the discussion may continue to be of gaps, possible bridges and closed loops. The present position is of at least a partial systems equilibrium—with the loop of education and practice closed to much of research. But the potential for disequilibrium exists because of the uncontrolled presence of fundamental research.

The above analysis is compatible with a conclusion reached by Baxter (1988) in relation to the gap perceived between accounting research and practice—that research should be left to develop independently of practice. It is also compatible with a view from cybernetics argued by Robb (1989) that there may exist supra-human organisations which develop beyond the overall control of individual human beings. Such systems have been originally identified and termed *autopoietic*—that is autonomous, self-referring and self-constructing (Maturana and Varela, 1979). They survive because of their self-organisation in a process of constant adaptation to retain their viability, but without incorporating any change which is likely to alter their unique identity and organisation. What Robb has argued is that such systems may reach a point at which, despite human controls in sub-systems, the total system controls itself to protect its identity.

The suggestion in this paper is that such a state of autopoiesis may well exist in the world of accounting—that is, individual sub-systems such as education and practice may be controlled and change through closure procedures, but the overall system has a constant identity and organisation (and remains viable) despite actions within the sub-systems. Irrespective of the desire of individuals within these sub-systems to undertake research activity, the total system selectively accepts only those research findings which are crucial to the maintenance of its organisation and viability; and rejects those that are a threat to it. If this is the case in accounting then it would appear counter-productive to attempt to manage the fundamental research function to engineer influence, impact or change in practice or in the classroom. Perhaps, then, this review should close with the open questions that accounting education and practice have become parts of such a meta-system, that accounting research of an anthropological nature is a necessary means of charting the progress of the meta-system, and that fundamental accounting research should remain separate from the education and practice functions? These questions are part of an agenda for debate about the future of accounting. The debate must begin.

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# Share Option Rewards and Managerial Performance: an Abnormal Performance Index Model

**Don A. Egginton, John J. Forker and Mark J. Tippett***

**Abstract**—Managerial share option schemes are widely used as a means of motivating and rewarding corporate performance. Such schemes normally adopt a static exercise price; when additional exercise criteria are employed they are often based on earnings per share. A static exercise price does not adjust for economic changes outside the control of management, and earnings per share hurdles have similar limitations. This paper presents a 'phantom' managerial option based on relative performance, together with a pricing model for the valuation of the option. The option is developed and demonstrated using an abnormal performance index. It offers a structure which could be used for different forms of performance measurement, and resolves some important criticisms of the reward and incentive effects of traditional schemes.

## Introduction

Stock option schemes are an element in the remuneration packages of many corporate managers.[1] For the purpose of this paper share options are assumed to perform the specific role of rewarding management for the achievement of unexpectedly good performance. Other aspects of a remuneration package are considered to be based on expected performance.[2]

Our concern in this paper is with the problem of ensuring that management's achievements for shareholders are consistently reflected in rewards from option schemes. It is conventional practice in such schemes to adopt a static exercise price, which is usually the share price when the option was granted. The fundamental flaw in this practice is that it adopts a static benchmark for management's performance in a dynamic world. When expectations are downgraded, or pessimism affects share prices, options can become worthless even though management might be achieving superior performance in difficult circumstances.[3] Conversely, when markets boom, underperforming management can still reap rewards, despite their poor achievements.

Share prices change over time through expected factors ('normal returns') and through unexpected factors (windfalls). Incentives should motivate management to produce unexpected gains from factors within their control, so that ideally options should adopt a moving exercise price which incorporates all other factors. Consequently the exercise of the option would be conditional on management's achievement of a better than expected performance with respect to factors which are controllable by management.

The 'ideal' approach is not operationally feasible because shareholders' expectations are unobservable. However, the notion of a moving target offers important possibilities which are examined in this paper. One approach that has elements of the moving target is a performance hurdle based on earnings per share (EPS). An EPS hurdle for option schemes is advocated by a major

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*Don A. Egginton is professor of accounting at Bristol University, where John J. Forker is a lecturer in accounting; Mark J. Tippett is professor of accounting at the Australian National University. Work on this paper was started when Mark Tippett was Touche Ross Visiting Research Fellow at Bristol. The authors gratefully acknowledge considerable benefit from discussions with Tony van Zijl, graphics assistance from Gerry Austin, assistance in obtaining data from Claire Jones of the London Business School Financial Services, financial assistance from Arthur Anderson & Co., and very helpful comments from two anonymous referees.

[1] Harcourt (1987) p. 67 presents the results of a UK survey which shows that the adoption of schemes is related to company size. 62% of companies with annual sales between £1 m and £40 m operated executive option schemes, compared with 97% of companies with sales exceeding £1 bn. Smith and Watts (1982, p.140) quote a US report that 'in 1978 and 1979 over 85 per cent of the largest 1000 firms had at least one type of incentive plan other than a bonus'.

[2] Share options may, of course, feature in a remuneration package for reasons other than incenting good performance. For example, they may be used because they offer tax advantages in rewarding management.

[3] The stockmarket collapse of October 1987 brought an immediate proposal that managers should be allowed to cancel their existing options and 'take up new options at better rates'. This proposal, reported in *Accountancy Age*, 29 October 1987, was made by the Chairman of the Reward Group. He expressed similar views in a letter to the *Financial Times*, 12 November 1987.

institutional investment committee in the UK. The EPS measure will be examined critically, and a superior method will be presented which effectively provides an option incorporating a moving performance hurdle. This option is based on the abnormal performance index (API) for a company's shares. Such an option could be created as a tradeable security, but trading costs can be avoided by calculating option rewards from market data, thus creating a 'phantom' API option.

A model for the valuation of API options will be developed. Valuation at the time of granting the options allows the overall compensation of managers to be adjusted for options awarded. This is illustrated by an example of the sacrifice by a manager of a certain amount of salary in exchange for options, leaving the manager's level of utility unchanged. Such compensation adjustments can aid the operations of an efficient labour market, and remove potential conflicts between shareholders and management on the adoption of option schemes. Finally, the application of the valuation model will be demonstrated for two major UK companies.

### *Criteria for Performance-Related Rewards*

The problems of motivating and appraising performance have long preoccupied accountants,[4] and in recent years both accountants and economists have explored these issues in the context of agency theory.[5] At the heart of these preoccupations are the assumptions that 'superior' managerial performance can be motivated by the prospect of reward (the incentive effect), the difficulty of observing or measuring the achievement of superior performance (the monitoring problem), and the quantification of the rewards so that their appropriateness can be assessed by interested parties (the valuation process).

We adopt the usual behavioural assumption that the appraisal of performance should be aligned with responsibility. This in turn assumes that appraisal determines rewards, and that expectations of rewards motivate effort. The principles underlying these assumptions are formalised in the expectancy theory of motivation (House, 1971, Ronen and Livingstone, 1975, summarised in Emmanuel and Otley, 1985). This hypothesises that a person's motivation will depend, *inter alia*, on the expectation (subjective probability) that effort will achieve a task, on the expectation that achievement will in fact be rewarded, and on the utility from rewards.

The expectancy theory of motivation formalises widely accepted understanding of behaviour. It has two important implications for share option schemes. The first is that a scheme is likely to have the most impact on motivation for a manager who has a high expectation that his or her own effort will actually affect performance. Since it is *company* performance which is at issue in share options, this implies that options should be restricted to managers whose performance translates directly into corporate performance. For simplicity we shall assume that options are restricted to managers with overall corporate or R & D responsibilities. The second implication is that motivation will be crucially affected by the degree of confidence that superior results will be identified and rewarded; it is this relationship between motivation, measurement and reward which will underpin our concern with the measurement and reward of superior performance.

Our main concerns are with the monitoring problem of measuring superior performance and the valuation process by which rewards are determined. Effectiveness in these contexts requires:

(a) a definition of 'superior' performance,
(b) an 'objective' measure of performance, and
(c) a mechanism for ensuring that the value of rewards reflects the measure of superior performance.

These requirements will be considered first in relation to the EPS criterion, and then in relation to our own proposals.

## The EPS hurdle

A simplistic view, which is held by some sections of the financial community,[6] is that a grant of a managerial stock option exercisable at the current market price is costless to the firm. This view implies that any increase in market price is attributable to superior management performance, so that assignment of part of that increase to managers still leaves the shareholders better off. The 'costless' view is clearly invalid, since it is well known (e.g. Black and Scholes 1973) that a call option exercisable at the current market price must have a value. Nevertheless, it is commonplace for managerial stock options to be granted without any performance hurdle, and we are not aware of any country in which a performance clause is a legal requirement. In the UK the Finance Act 1984 relieves managerial stock options from income tax if certain requirements are satisfied,[7] but there is no reference to performance, so that managers can be granted valuable stock options unconditionally if shareholders consent.

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[4] Problems of motivation permeate the behavioural accounting literature as far back as Argyris (1952); this paper is more concerned with appraisal measurement issues of the kind explored by Demski (1967) and Amey (1973).

[5] Some pertinent papers are Jensen and Meckling (1976), Shavell (1979), Baiman and Demski (1980), Holstrom (1982) and Antle and Smith (1986).

[6] This view is implicit in the UK's Finance Act 1984, which does not impose any tax effect at the time of issue of managerial stock options.

The Association of British Insurers (ABI) has adopted a policy of persuading UK companies to use performance hurdles in managerial option schemes. Its most recent guidelines (ABI 1987) have features based on a scheme initiated by the Burton Group. The ABI employs the sanction of advising insurance companies to vote their shareholdings against schemes which flout the guidelines. The guidelines of the other major UK body of institutional investors, the National Association of Pension Funds (1984), make no reference to performance hurdles. The contrast between the two approaches reflects the difficulties inherent in framing performance hurdles for option schemes.

The ABI's starting point is the Finance Act 1984, which requires that the exercise period should be between three and ten years from the date the option is granted, and that the exercise price should not be less than the market price at the date of the grant.

The guidelines can be summarised using the following notation:

$X$ = exercise price
$P_o$ = market price of share at the date of the grant
$Y$ = period from grant of option to its exercise
$N$ = number of shares in option scheme
$n$ = number of shares over which an option is granted to a manager
$I$ = number of company's issued shares
$S$ = salary and other emoluments of participant

$$M = \frac{P_o n}{S}$$

$$R = N/I$$

Several elements of the ABI rules derive from requirements of the 1984 Finance Act. In particular $X$ should not be less than $P_o$, $Y$ should be between three and ten years, and the market value of optionable shares is restricted to a multiple of the manager's salary (i.e. the maximum value of $M$ is limited). The distinctive feature of the ABI rules is that they set two levels of constraints on the magnitudes of $M$ and $R$, and apply different performance hurdles H1 and H2 to each level. The guidelines can be stated generally:

$$X \geq P_o \tag{1}$$

$$3 \leq Y \leq 10 \tag{2}$$

H1 applies if $0 \leq M \leq 4$ and

$$0\% \leq R \leq 5\% \tag{3a}$$

H2 applies if $4 \leq M \leq 8$ or

$$5\% \leq R \leq 10\% \tag{3b}$$

An option which is granted subject to H1 cannot be exercised unless real growth in earnings per share has been achieved for some three-year period following the grant of the option. For H2 an option cannot be exercised within five years from the date of the grant, and the company's growth in EPS over a period of at least five years must place it in the top quartile of FTSE 100 companies[8] over the same period.

For example, assume a company with issued shares of 40 m and market price of £2 per share. A maximum of 2 m shares could be made available under a managerial share option scheme subject to H1. An individual manager earning £100,000 could be granted options on a maximum of 200,000 shares under that scheme. The company could make available a further issue of 2 m shares which would be subject to H2. The manager earning £100,000 could then be granted options over a further 200,000 shares; the exercise of these further options would be subject to the conditions for H2 stated above.

The constraints which the ABI places on $M$ and $R$ implicitly acknowledge the hazards of performance related rewards. This approach is inspired by the danger that rewards can outstrip performance, a danger which is implicit in the concerns of the agency literature. If rewards reliably matched management performance there would be no need for constraints.

In terms of the requirements for an effective scheme which were outlined earlier, the ABI rules provide an unambiguous definition of superior performance based on EPS. However, EPS is itself inadequate as an objective measure of performance for three reasons. The first is that it is unadjusted for macroeconomic factors which lie outside management's control. The second is that EPS is based on historical cost earnings, whose ability to reflect changes in underlying corporate performance has been widely challenged. The merits of alternative accounting bases are not at issue here, but the incomplete way in which price changes are reflected in EPS constitutes a limitation of the measure.

The third flaw of EPS is that the measure could be manipulated by discretionary decisions of management. Watts and Zimmerman (1978) postulated that bonus schemes based on accounting earnings create an incentive for managers to adopt accounting methods which maximise the value of their rewards. Healy (1985) reports empirical results supporting that hypothesis and Watts and Zimmerman (1986, Chapters 9 and 11) provide further consideration of the issue. However, growth in EPS is also affected by management's discretionary economic decision over dividends: managers whose rewards are linked to the growth in EPS will have an incentive to limit dividends so that retained profits can be reinvested to boost EPS, even if the returns from future reinvestment are less than the cost of capital. Thus discretionary decisions of both an accounting and an economic character could distort EPS as a measure of performance.

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[7] The gains made when options are exercised remain taxable as capital gains. However, the Finance Act 1988 simultaneously lowered income tax rates and applied those rates to capital gains, so that the advantage of an approved option scheme is now mainly a matter of delayed tax payment.

[8] Companies included in the Financial Times Stock Exchange 100 Index.

The ABI approach also fails in two respects on the value of rewards. The first shortcoming is that the rules do not provide a means of valuation by which the appropriateness of the initial grant of options can be established. The second weakness is inherent in all conventional option schemes which use a fixed exercise price: rewards are not consistently aligned with genuinely superior performance. When stockmarket prices generally are rising, managers can gain rewards despite inferior performance, and conversely if the stock-market is depressed there may be no rewards for managers who have achieved superior performance in adverse circumstances. This failure to align rewards with performance undermines the incentive effects of conventional schemes.

## Determining superior performance

Share options are regarded here as a means of motivating and rewarding managers for the achievement of superior performance, which means performance in excess of what would ordinarily be expected of management. It is assumed that the achievement of ordinarily expected performance is rewarded by other components of the remuneration package. Our potentially 'ideal' scheme would therefore reward management in proportion to the achievement of that component of performance which was better than expected and within the control of management, but as shareholder expectations are unobservable a proxy must be adopted.

We shall consider this proxy scheme in the context of the two elements of measurement and valuation. These relate to the requirements stated earlier for the effectiveness of an option scheme: a defined and 'objective' measurement of superior performance, and a valuation mechanism to ensure that the level of rewards reflects the superior performance achieved.

### *Measurement*

A central function of management is to work within a changing economic environment to make the best available returns for owners in the prevailing conditions. This function is not adequately recognised if management is rewarded for performance over several years by options with a static exercise price. Rewards need to be related to results which can be regarded as the consequence of management activity. Since returns for shareholders are at issue, a desired measure might assess performance against shareholder expectations. But shareholder expectations are unobservable. Therefore a proxy is needed which will estimate that part of the firm's performance.

If superior performance can be interpreted as 'better than average', the performance of firms on average can be adopted as our proxy for shareholders' expectations. Thus the performance of firms as a whole, or in a specific industry, can provide the basis for comparison. This conclusion is consistent with the analysis in favour of relative performance measurement by Holstrom (1982), although the route adopted is different.

With the basis for comparison established, the measure of performance has to be decided. The obvious alternatives are some form of accounting measure or share price. These alternatives could be discussed at length, but for the present purposes share prices have the merit of being central to the concerns of shareholders, appropriate to the context of stock options, comparable in valuation between firms, and publicly available as data for relative performance comparisons. In other contexts,[9] accounting measures are more appropriate for the assessment of relative performance.

As is particularly well described by Beaver (1972), the market model in equation 4 (Markowitz, 1959; Sharpe, 1963) defines the stochastic process generating security price changes in a manner which provides a proxy measure of the component attributable to unanticipated managerial effort. Given observation of the *ex post* return on the market index, the expected return from a security can be inferred in equation 5 from its assumed linear relationship to the market index. The difference between the security's expected return and its *ex post* return in equation 6 provides a proxy for the effect of unanticipated managerial effort $\mathrm{d}U_i(t)$ over the interval $[t, t + \mathrm{d}t]$.[10]

$$R_i(t) = \beta_i R_m(t) + \mathrm{d}U_i(t) \qquad (4)$$

$$E[R_i(t) \mid R_m(t)] = \beta_i R_m(t) \qquad (5)$$

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[9] Some examples are: where responsibility for a segment of the company is at issue, where the company's shares are unquoted, or where the volatility of share prices is distrusted.

[10] This use of an *ex post* reference point for the appraisal of performance might be considered to have some similarity with the arguments for an *ex post* optimum advanced by Demski (1967). Major differences are, however, that our use of an *ex post* reference point would be based on observable market data and that managers' goals would be explicitly set in terms of relative performance.

$$R_i(t) - E[R_i(t)|R_m(t)] = \mathrm{d}U_i(t) \tag{6}$$

where $R_i(t) = \ln[P_i(t + \mathrm{d}t)/P_i(t)]$ is the return on the $i$th company's shares over the interval $[t, t + \mathrm{d}t]$, $R_m(t) = \ln[M(t + \mathrm{d}t)/M(t)]$ is the market's return, $\beta_i$ measures the sensitivity of returns on the $i$th company's shares to the returns of the market portfolio and $\mathrm{d}U_i(t)$ is a white noise or stochastic component with mean zero and variance $\sigma^2\,\mathrm{d}t$.[11] Conventionally the total of these stochastic components over time is interpreted as an abnormal performance index (API). The size and sign of the index provides, for present purposes, a measure of the superior or inferior performance achieved by management.

Abnormal performance information for most listed companies is provided by commercial 'beta' services on a regular basis. A monthly API statistic is assumed to be sufficiently timely for our purposes. However, as executive share option schemes usually cover a period of several years, we need a method whereby the monthly API statistics can be aggregated into a measure covering a much longer period. From equation (4) we have the following measure of abnormal or unanticipated performance over the month:

$$\mathrm{d}U_i(t) = \ln\left[\frac{P_i(t + \mathrm{d}t)}{P_i(t)}\right] - \beta_i \ln\left[\frac{M(t + \mathrm{d}t)}{M(t)}\right] \tag{7}$$

where, as previously, $\ln[P_i(t + \mathrm{d}t)/P_i(t)] = R_i(t)$ is the continuously compounded return on the share and $\ln[M(t + \mathrm{d}t)/M(t)] = R_m(t)$ is the market's continuously compounded return. For the entire $n$ months $[t_{j-1}, t_{j-1} + \mathrm{d}t]$, $j = 1, 2, \ldots\ n$ since the options were written we have the following measure of management's abnormal performance:

$$\begin{aligned} U_i(t_n) &= \sum_{j=1}^{n} \mathrm{d}U_i(t_{j-1}) \\ &= \sum_{j=1}^{n} [U_i(t_{j-1} + \mathrm{d}t) - U_i(t_{j-1})] \end{aligned} \tag{8}$$

where $U(t_0) = U(0) = 0$. It follows that the abnormal performance measure over the entire $n$ months can be derived by merely summing the monthly API statistics.

This is a particularly useful result since, as noted above, abnormal performance information for listed companies is available from commercial 'beta' services. Further, since $U_i(t_n)$ is distributed normally with zero mean, the criterion for exercising the option could be set at any mutually agreed level. One obvious candiate is $U_i(t_n) > 0$. This criterion has the desirable effect of encouraging managers to adopt investment projects which have a positive expected abnormal performance measure or, equivalently, positive expected net present value. By aligning rewards more closely to performance the incentive limitations of conventional schemes, discussed earlier, are avoided. The use of market data, rather than relative EPS performance, also reduces the problems of discretionary accounting changes (provided the market sees through at least some proportion of manipulative accounting policy changes).

If required, the above analysis could be modified to take account of industry effects. The statistic $U_i(t_n)$ would then be a residual after both market and industry factors had been taken into account. For simplicity, however, the following discussion will assume that $U_i(t_n)$ as the residual from market performance will provide a satisfactory proxy for unanticipated managerial performance.

The API criterion could be used in three different ways. First, it could simply be substituted for the ABI's EPS rules, in combination with a conventional option scheme. For example, managers might not be allowed to exercise their options unless a positive statistic had prevailed for some three-year period following the grant of the option. Although an improvement on the EPS hurdles, that use would be of limited benefit because the rewards (market price at exercise, less the static exercise price) would still be heavily influenced by general economic factors, rather than by firm-specific performance.

A second possibility would be to pay a cash bonus proportional to the API. Compensation packages which included penalties for negative APIs are unlikely to be attractive to risk-averse managers, but the bonus could be paid on a positive API. That solution has the merit of being uncomplicated, and it could prove useful to companies. However, it does not address the issue of improving executive option schemes, which is the purpose of this paper. Moreover, an option approach has two advantages over an API bonus (apart from any tax considerations). Options can be valued when granted and this facilitates determination of the total value of a manager's compensation package. An option would also have behavioural merits where a negative API has accumulated in the early part of an assessment period; managers could be daunted by the knowledge that no bonus would be paid until the backlog had been erased, but an option would retain some (small) value which would grow as performance improved.

The third possibility, to be developed in this paper, is to write options based on the API statistic, which can then form the basis for rewarding managers. But just as conventional managerial options are not costless, the granting of API options would involve a cost to the company. Since *ex ante* it is equally probable that the API will prove positive or negative, there must be a 0.5 probability that an API option will produce a reward; the mere grant of an option transfers value to the manager. If it can be assumed that a company pays executives at market prices, then a compensation package which includes valuable API options should have an overall value equal to the market price of the executive in the labour market.

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[11] Conventionally the market model is expressed with an intercept term. For ease of exposition we suppress the constant term in each of the above equations. However, the analysis can be generalised for the introduction of a constant term but is far more cumbersome than the treatment contained in the text.

Thus compensation packages cannot be negotiated with full information unless the API options are capable of being valued *ex ante*. The value of the API options *ex post*, when they are exercised, must also be established for managers to get their rewards. The valuation of API options must therefore be considered.

### *Valuation*

In order to value rewards relative to the API it is first necessary to demonstrate the feasibility of creating a tradeable security with a value based on the API statistic. The creation of such a security would be relatively straightforward. It involves investing £1 in the firm's shares and going short to the extent of £$\beta$ in the market portfolio. Calls written on the FT Actuaries All Share Index[12] could serve this purpose. The net worth of this portfolio would provide a value for $U$ (dropping $i$ and $t$ for convenience).

Our proposal is that an executive share option scheme could be adopted which effectively amounts to managers being granted a call option on the API statistic. In fact the incentive and reward effects of the scheme could be obtained by observation of market data, without necessarily trading in the market, in which case managers would be granted phantom options. There are some precedents for phantom incentive contracts in the US and UK.[13] The exercise price of the option could be set at zero (i.e. any performance in excess of the market average would be rewarded) or some higher level could be adopted.

Such a call option can be valued by proceeding along similar lines to the Black and Scholes (1973) option pricing model. However, it is necessary to adapt the Black-Scholes formulation in order to accommodate the negative values for $U$ which may arise when managerial performance falls short of expectations.[14]

The fundamental insight on which the Black—Scholes model rests is that a risk-free or hedged portfolio can be created by a long investment in an equity security, and a compensating short investment in call options written on that equity security. Using these procedures, we show in Appendix 1 that the value of a European call option written on a firm's abnormal performance index is given by:

$$W(U,t) = [U - C\mathrm{e}^{-r(T-t)}]\mathrm{N}(d) + \sigma\sqrt{\frac{1-\mathrm{e}^{-2r(T-t)}}{4\pi r}}\,\mathrm{e}^{-1/2d^2} \quad (9)$$

where $U$ is the value of the abnormal performance statistic at time $0 \leq t \leq T$ for $T$ the date of the option's maturity, $C$ is the value of $U(T)$ at which the option may be exercised, $r$ is the continuously compounded risk of free rate of interest, and $\sigma^2$ is the variance rate in the abnormal performance index:

$$N(d) = \frac{1}{\sqrt{2\pi}}\int_{\mathrm{d}}^{\infty} \mathrm{e}^{-1/2z^2}\,\mathrm{d}z$$

is the value of the complementary accumulated standard normal distribution, and:

$$\mathrm{d} = \frac{C - U\mathrm{e}^{r(T-2)}}{\sigma\sqrt{\dfrac{\mathrm{e}^{2r(T-t)}-1}{2r}}}$$

The above formula (9) provides the *value* of a European call option written on the abnormal performance index, $U$.[15] As a simple illustration of how the above formula might be applied, consider the following scenario. Suppose a manager is currently earning the certain salary package $s + \mathrm{d}s$. As an alternative, suppose he is offered compensation $s$, together with $k$ options whose payoff is the unknown amount $Z$ where $Z$ equals

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[12] We adopt the Financial Times All Share Index because it is a widely based index of all shares quoted on the London Stock Exchange, and therefore an appropriately wide measure of the market index, rather than the narrower FTSE 100 index adopted by the Association of British Insurers.

[13] Smith and Watts (1982) record the use of stock appreciation rights in the US, where executives may receive the difference between the stock price and the exercise price without actually taking out options. They also record phantom stock plans, in which executives are given the cash value of stocks. In both cases the motive appears to be the minimisation of transaction costs.

[14] Consider the nature of the abnormal performance residuals. These have an expected value of zero, can take positive or negative values, and are described by the stochastic process $\mathrm{d}u = \sigma\,\mathrm{d}z$. The process specified by Black and Scholes $\mathrm{d}s = \mu s\,\mathrm{d}t + \sigma s\,\mathrm{d}z$ is inappropriate because variance is a function of $s$ (where $s$ is share price). The process assumed in this paper is a special case of Cox and Ross (1975, p. 151) namely $\mathrm{d}u = \mu u\,\mathrm{d}t + \sigma\,\mathrm{d}z$ where the drift term is set to zero. However, in order to model limited liability they constrain the process to non-negative values (p. 162). In contrast we require a solution for an unbounded process which can accommodate negative performance residuals; it is this solution which is presented in Appendix 1.

[15] For expositional purposes the above model assumes non-stochastic interest rates and volatility. If that were not the case, we would obtain a partial differential equation which would have to be solved either numerically or using separation of variables in conjunction with an infinite series expansion for the initial condition. Our approach is consistent with Cox and Rubinstein (1985, p. 425) who suggest using the relevant current interest rate in conjunction with a non-stochastic interest rate formula in such circumstances.

$E[kW(U, t)]$. Following Hirshleifer (1970, p. 227) and assuming for convenience all payments to occur at the options' maturity, the number of options necessary to compensate the manager for the reduction in certain income is determined implicitly by the equation:

$$V(s + \mathrm{d}s) = E[V(s + Z)]$$

where $V$ is the manager's preference function for certain income and $E$ is the expectations operator. Expanding both sides of the above equation as Taylor series about the point $s$ and taking expectations, gives:

$$\mathrm{d}s \simeq E(Z) + \tfrac{1}{2}[\mathrm{var}(Z) + E^2(Z)]\frac{V''(s)}{V'(s)} \qquad (10)$$

where $E(Z)$ is the expected value of the uncertain income stream, $\mathrm{var}(Z)$ is its variance, and $V'(s)$ and $V''(s)$ are the first and second derivatives of the manager's utility function $V(s)$. The right hand side of the above equation gives the certain income the manager would be prepared to forgo, in terms of the first two moments of the uncertain income stream and the manager's Pratt-Arrow measure of risk aversion. If we let $C = 0$ in equation (9), then at $t = 0$ the expected payoff from a single phantom option at $t = T$ is:

$$E(Z) = \sigma\sqrt{\frac{T}{2\pi}} \qquad (11)$$

with associated variance:

$$\mathrm{var}(Z) = \frac{\sigma^2 T(\pi - 1)}{2\pi}$$

Proofs for these results are presented in Appendix 2. Given an assumption of the manager's risk aversion coefficient, equation (10) can be implemented as illustrated in Table 1.

Unlike a certain salary which is payable irrespective of performance, a phantom API option which rewards superior performance should increase managers' expectancies that successful accomplishment will in fact be rewarded; that increase will in turn enhance motivation in accordance with the expectancy theory of motivation considered earlier. Should management perform according to expectations there will be no difference between the utility derived from either method of compensation. But the inclusion of the phantom options in a remuneration package gives management an incentive to achieve the better than

**Table 1**
**Example of Managerial Compensation**

Assume a time period of one year, at the end of which a manager would receive the compensation package consisting of a fixed salary of £40,000 and the proceeds from $k = 100{,}000$ API call options with an exercise price of zero. The expected return from the options is:

$$E(kZ) = kE(Z) = k\sigma\sqrt{\frac{1}{2\pi}}$$

whilst the variance in the return to the options is:

$$\mathrm{Var}(kZ) = k^2\,\mathrm{Var}(Z) = \frac{k^2\sigma^2 T(\pi - 1)}{2\pi}$$

Supposing the manager to have the preference function:

$$V(s) = \log s$$

it follows that:

$$\frac{V''(s)}{V'(s)} = -\frac{1}{s}$$

is the Pratt-Arrow measure of risk aversion. Variances computed for the Burton Group Plc and Jaguar Plc for the later empirical section of this paper can be adopted for this example. For Burton, we have $\sigma = 0.0758$ so that:

$$\mathrm{d}s \simeq E(kZ) + \tfrac{1}{2}[\mathrm{Var}(kZ) + E^2(kZ)]\frac{V''(s)}{V'(s)}$$

$$\simeq £3023.98 - £359.10$$

$$\mathrm{d}s \simeq £2{,}664.88$$

Hence, a Burton Group Plc manager earning £42,664.88 in certain income would be prepared to forgo £2,664.88 of this income in exchange for 100,000 phantom Burton API options with an exercise price of zero. For Jaguar $\sigma = 0.0823$ and similar calculations show that $\mathrm{d}s = £2{,}859.96$.

**Table 2**
**Tabulation of Variables**

*Return Generation Models*

| | |
|---|---|
| $R_i(t)$ | The continuously compounded monthly return for each firm. |
| $\beta_i(t)$ | Betas were obtained from the London Business School Risk Assessment Service. These are computed on a quarterly basis. The $\beta$ for each month in any quarter was assumed equal to the start of quarter $\beta$. In the case of Jaguar it was assumed that the first $\beta$ available (third quarter of 1985) applied since the grant of the options. |

*Option Valuation Model*

| | |
|---|---|
| $R_f(t)$ | The continuously compounded annual return for 90 day UK Treasury Bills. Pure discount rates for longer term bonds were not available. |
| $\sigma$ | The standard deviation of the realised monthly abnormal performance residuals measured *ex post* at the end of the study period (November 1987). |

expected results which will increase the value of their rewards. This ability of the options to provide a basis for *ex post* settling up is consistent with Fama's (1980) rationalisation of the role of managerial labour markets.

Compared with conventional executive option schemes, the phantom option has the major advantage that it would avoid the transaction costs of buying and selling shares incurred by conventional schemes. The option is also capable of being adapted for use with an API related to some industry grouping.

A potentially undesirable feature of conventional option schemes is that they might encourage management to adopt projects which increase the variance of the company's returns. This danger can be reduced in the application of API options by the monthly recalculation of betas from data for the month preceding that for which the residuals are estimated. That approach has been adopted in the following empirical section.

## Empirical investigation

An empirical investigation was conducted on the performance of two UK listed companies which have executive share options schemes. The companies were Burton Group Plc and Jaguar Plc. Data were obtained from the London Business School Risk Assessment Service for monthly log returns (including dividends) for Burton over the period January 1980 to November 1987, and for Jaguar from the date of privatisation (September 1984) to November 1987.

The characteristics of the share options valued follow from the data available, and as regards exercise periods, fall within the Inland Revenue guidelines.[16] It is assumed that options with a ten-year life were granted in January 1980 for Burtons. A seven year life was assumed for Jaguar options granted at the time of the firm's privatisation in September 1984. For both options exercise is assumed conditional on $U(T) \geq 0$.

The values provided by the API option pricing model are illustrated with reference to abnormal performance as measured by the market model. This is specified as follows:

$$R_i(t) - \beta_i R_m(t) = \mathrm{d}U_i(t) \tag{4}$$

For Burton we had 95 monthly observations and hence $t = 1, 2, \ldots 95$. For Jaguar we had 39 monthly observations, so that $t = 1, 2, \ldots 39$. Table 2 contains a specification of the variables.

OLS regressions were run to test for the significance of an intercept term. For both companies the intercepts were insignificantly different from zero.[17] The variances of the monthly residuals ought to be determined *ex ante*, but these are unobservable. On the basis of the assumption that the variance will be constant across time a single variance was computed for each company from the *ex post* residuals obtained from (4). By application of the Goldfeld-Quandt test for stability of the variance the hypothesis that these variances were stable could not be rejected.[18]

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[16] As noted earlier, the Finance Act 1984 requires a three year period to elapse from the date of the grant before exercise of an approved option is possible. A grant date of September 1984 allows hypothetical realisation prior to the market collapse in October 1987.

[17] The results were:

*OLS regression results testing for significance of intercept terms*

| | *Burton* | | *Jaguar* | |
|---|---|---|---|---|
| | $\alpha$ | $\beta$ | $\alpha$ | $\beta$ |
| Coefficient | 0.0099 | 0.9074 | −0.0045 | 1.4106 |
| s.e. | 0.0079 | 0.1297 | 0.0121 | 0.175 |
| $R^2$ | 0.3445 | | 0.637 | |

[18] The Burton sample of 95 observations was partitioned into three chronological sub-sets and the Goldfeld-Quandt test applied to the first and third sets. For Jaguar a two way partition was employed. In both cases the hypothesis of equality of variances was satisfied.

**Table 3**
**Summarised Values for API Option Pricing Model**

| | *Burton* £ | *Jaguar* £ |
|---|---|---|
| Start of Period | 0.0523 | 0.0638 |
| Maximum | 0.9533 | 0.6817 |
| End of Period | 0.4204 | 0.0579 |

Table 3 contains a summary of the values taken by the option pricing model across time for both firms. Figures 1 and 2 illustrate the behaviour of the API option values and the abnormal performance statistics. Also shown for comparison is the reward ($\max[0, P_t - P_o]$) that would be obtained from the exercise of a conventional option with a static exercise price equal to $P_o$.

**Figure 1**
**Burton API Option Valuation**

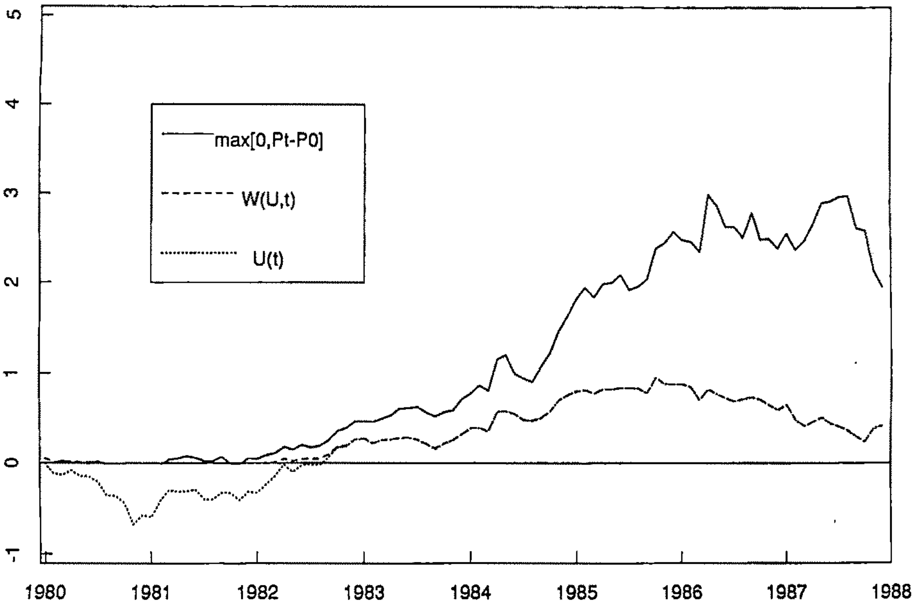
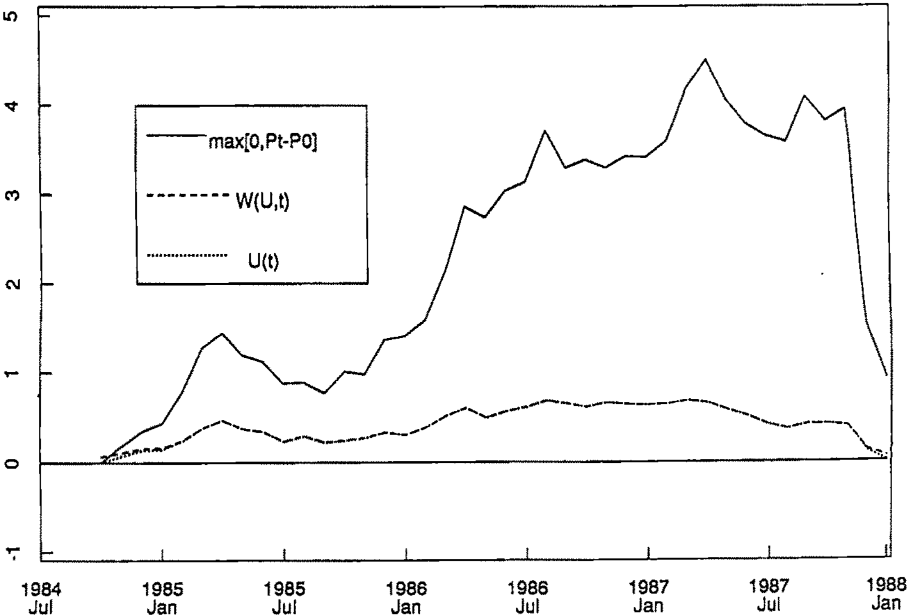


**Figure 2**
**Jaguar API Option Valuation**



*Commentary on the Performance of Burton and Jaguar*

An interesting feature of both the Jaguar and Burton graphs is that the API option value and the abnormal performance index value converge as the abnormal performance index increases. From equation (9) it will be noted that as $U$ increases, $d$ becomes larger so that $N(\mathrm{d}) \to 1$. Similarly, the term $\exp[-\frac{1}{2}d^2] \to 0$. However, it is important to note that the options retain some value even though the API becomes negative or zero, as can be seen for the earlier years of Figure 1 and for the final plot of Figure 2. Thus, as discussed earlier, the options would have different reward characteristics from a straight bonus based on the API.

During 1980, adopted as the first year for Burton's options, there was a steady under-performance relative to target. By the middle of 1982 the deficit had been clawed back and superior performance was achieved until September 1986, when the worth of a phantom API option stood at £0.95. The value subsequently declined to £0.24 by September 1987, but rose to £0.42 in November. This increase in value between September and November reflected Burton's relatively strong performance in the October stockmarket collapse.

For the first six months after privatisation in September 1984 Jaguar's performance was consistently better than target, but relative performance then fell. Superior returns reappeared in 1986, and a high point was reached in June when the value of a phantom option was £0.68. Throughout 1987 Jaguar's performance was consistently below target and, in contrast to Burton, October was particularly bad.

In contrast with the API option values, the rewards arising from conventional options increased markedly in the bull markets up to October 1987. The differences contracted substantially with the market collapse. These comparisons provide a good illustration of the tendency of conventional options to reward managers in rising stockmarkets; a continuation of falling markets could correspondingly lead to the under-reward of managers.

## Conclusions

Phantom options based on the abnormal performance index offer a means of defining and rewarding superior managerial performance. This alignment of rewards with performance would overcome certain limitations of conventional stock option schemes, and would also be preferable to the recent use of performance hurdles based on EPS. Phantom options would have the additional advantage of avoiding the transaction costs of conventional managerial options.

The phantom options have been shown to be capable of valuation, using the model developed in this paper, and the empirical section of this paper has demonstrated the application of abnormal performance index options for two firms.

The option model is based on the assumption that superior managerial performance is directly translated into abnormal share performance. Although that is an assumption which can readily be challenged as being too strong, it is consistent with the role of managerial stock options as a means of rewarding managers in line with changes in share price. The model provides a structure within which more sophisticated measures of managerial performance can be evolved; the development of such measures is a matter for future research.

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## Appendix 1

Using the arbitrage arguments first laid down by Black and Scholes (1973) we derive the value of a European call (or put) option written on $U(t)$. Since $U(t)$ constitutes a *Weiner-Levy* process with zero mean and variance parameter $\sigma^2$, then by Itô's lemma, we have:

$$\mu(U,t) = \tfrac{1}{2}\sigma^2 \frac{\partial^2 W}{\partial U^2} + \frac{\partial W}{\partial t} \tag{1}$$

where $W(U,t)$ is the price of a call option written on $U(t)$ and :

$$\mu(U,t) = \operatorname*{Limit}_{\Delta t \to 0} \frac{E_t[\Delta W(U,t)]}{\Delta t} \tag{2}$$

$E_t$ being the expectations operator, taken at time $t$. Following Black and Scholes (1973, pp. 640–641), suppose we form the hedge portfolio consisting of a unit investment in the abnormal performance index $[U(t)]$ and a "short" investment of $[\partial W/\partial U]^{-1}$ options. Assuming continuous rebalancing, if $S(U,t)$ is the value of the hedge, then:

$$S(U,t) = U(t) - \frac{W(U,t)}{\dfrac{\partial W}{\partial U}} \tag{3}$$

and using Itô's lemma:

$$\operatorname*{Limit}_{\Delta t \to 0} \frac{E_t[\Delta S(U,t)]}{\Delta t} = -\frac{\left[\tfrac{1}{2}\sigma^2 \dfrac{\partial^2 W}{\partial U^2} + \dfrac{\partial W}{\partial t}\right]}{\dfrac{\partial W}{\partial U}} \tag{4}$$

However, since $S(U,t)$ constitutes a riskless hedge (Black and Scholes 1973, pp. 641–642), we must have:

$$\operatorname*{Limit}_{\Delta t \to 0} \frac{E_t[\Delta S(U,t)]}{\Delta t} = rS(U,t) \tag{5}$$

where $r$ is the continuously compounded riskless rate of interest. Using this result, the value of a call option written on the abnormal performance index is obtained as the solution *of the* partial differential equation:

$$\tfrac{1}{2}\sigma^2 \frac{\partial^2 W}{\partial U^2} + rU\frac{\partial W}{\partial U} + \frac{\partial W}{\partial t} - rW(U,t) = 0 \tag{6}$$

with $0 \le t \le T$ and the boundary condition:

$$W(U,T) = \begin{matrix} U - C & \text{if } U \ge C \\ 0 & \text{if } U < C \end{matrix}$$

$C$ being the exercise price of the option at maturity (time $T$). If we make the substitutions:

$$W(U,t) = e^{-r(T-t)}F(\zeta,\eta) \tag{7}$$

where:

$$\zeta = \frac{\sqrt{2}[Ue^{r(T-t)} - C)}{\sigma}$$

$$\eta = \frac{e^{2r(T-t)} - 1}{2r}$$

then the above differential equation is reduced to the diffusion equation of mathematical physics (Crank 1975):

$$\frac{\partial^2 F}{\partial \zeta^2} = \frac{\partial F}{\partial \eta}$$

with initial condition:

$$F(\zeta,0) = F(\zeta) = \begin{matrix} \dfrac{\sigma}{\sqrt{2\zeta}} & \zeta \ge 0 \\ 0 & \zeta < 0 \end{matrix}$$

The solution to this problem is (Weinberger 1965, p. 328):

$$F(\zeta,\eta) = \frac{1}{\sqrt{2\pi}} \int_{\frac{-\zeta}{\sqrt{2\eta}}}^{\infty} \frac{\sigma}{\sqrt{2}}[\zeta + z\sqrt{2\eta}]\, e^{-1/2z^2}\, dz \tag{8}$$

Evaluating the above integral and substituting into equation (7), we find:

$$W(U,t) = [U - Ce^{-r(T-t)}]\, N(d) + \sigma\sqrt{\frac{1 - e^{-2r(T-t)}}{4\pi r}}\, e^{-1/2\,d^2} \tag{9}$$

where:

$$d = \frac{C - Ue^{r(T-t)}}{\sigma\sqrt{\dfrac{e^{2r(T-t)} - 1}{2r}}}$$

and $N(d)$ is the value of the complementary standard normal density function:

$$N(d) = \frac{1}{\sqrt{2\pi}} \int_{d}^{\infty} e^{-1/2z^2}\, dz$$

## Appendix 2

For a single API option, the pay-off at time $T$ is given by:

$$Z = W(U,T) = \begin{matrix} U(T) & \text{if } U(T) \geq 0 \\ 0 & \text{if } U(T) < 0 \end{matrix}$$

By construction, $U(T)$ is normally distributed with mean zero and variance $\sigma^2 T$. Hence, the expected value of $Z$ is given by:

$$E(Z) = \frac{1}{\sigma\sqrt{2\pi T}} \int_0^\infty U \exp\left[-\frac{1}{2}\left(\frac{U}{\sigma\sqrt{T}}\right)^2\right] \mathrm{d}U$$

Making the substitution:

$$w = \frac{1}{2}\left(\frac{U}{\sigma\sqrt{T}}\right)^2$$

implies that

$$E(Z) = \sigma\sqrt{\frac{T}{2\pi}}$$

To find the expression for the variance, we first compute the second moment around the origin:

$$E(Z^2) = \frac{1}{\sigma\sqrt{2\pi T}} \int_0^\infty U^2 \exp\left[-\frac{1}{2}\left(\frac{U}{\sigma\sqrt{T}}\right)^2\right] \mathrm{d}U$$

Making the substitution:

$$w = \frac{U}{\sigma\sqrt{T}}$$

implies:

$$E(Z^2) = \frac{\sigma^2 T}{\sqrt{2\pi}} \int_0^\infty w^2 \exp(-\tfrac{1}{2}w^2)\,\mathrm{d}w$$

Ignoring $\sigma^2 T$, the right hand side of the above expression is readily seen as half the variance of the *standard* normal distribution. Hence, its value is 0.5. Using this result, it follows that:

$$E(Z^2) = \tfrac{1}{2}\sigma^2 T$$

Recalling that Var($Z$) is the variance of the option's pay-off, we have:

$$\mathrm{Var}(Z) = E(Z^2) - [E(Z)]^2$$

$$\mathrm{Var}(Z) = \frac{\sigma^2 T(\pi - 1)}{2\pi}$$

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# UK Analysts' Earnings Forecasts

**Dennis H. Patz***

**Abstract**—This paper reports the results of an empirical study of UK analysts' earnings forecasts for 126 firms for the years 1980 and 1981. Six hypotheses regarding the accuracy of these forecasts are tested, with results which both confirm and conflict with prior UK findings. In addition, evidence is found of a greater than generally attributed sensitivity of test results to the measure of accuracy used.

## Introduction

This paper reports the results of an empirical study of the structural, temporal and comparative accuracy characteristics of UK analysts' forecasts of earnings per share. Such forecasts are produced and disseminated routinely by UK brokerage firms, and presumably consumed by UK market agents and others. Consequently, the accuracy properties of these forecasts are of immediate interest to the parties to this activity and germane to their informed use. Moreover, knowledge of the accuracy properties of analysts' forecasts are of wider research interest, for example as a 'test ground' for evaluating voluntary management forecasts (Givoly and Lakonishok, 1984, p. 119), and particularly as regards surrogation of market earnings expectations in market based research generally (see e.g. Brown, Richardson and Schwager, 1987). In this latter regard, such knowledge bears directly upon the robustness of the time series models employed as well as upon control for noise in measurement.

Only two studies pertaining directly to the accuracy of UK analyst forecasts and the apparent determinants of that accuracy appear available (Cooper and Taylor, 1983; and Bhaskar and Morris, 1984). The first is limited in scope and deals with forecasts for only 16 firms (1977–81). The Bhaskar and Morris (B&M) study is considerably more extensive in both scope and sample size, but relates to the period 1970–75 and so excludes developments in accounting disclosure, particularly those associated with the intense standard-setting activity of the 1970s, and other significant structural changes since that time. Moreover, it engenders methodological reservations.

Accordingly, the present study reconsiders the majority of the hypotheses tested in the B&M study, employing more contemporary data and a methodology which appears to overcome many of the perceived shortcomings of that study. In addition, evidence is provided which suggests that the inconsistencies observable in the findings of prior studies generally may be as much an artifact of error metric and other methodological choices as inherent complexity and instability in the earnings forecasting setting itself.

## Hypotheses

The hypotheses tested in the study, stated in the form of pre-test expectations, are:

$H_1$: Analysts' forecasts of earnings outperform those generated from simple/naive extrapolative models.
$H_2$: Forecasts are biased toward pessimism/underestimation.
$H_3$: Forecast accuracy improves as length of forecast period declines.
$H_4$: Forecast accuracy is associated with firm industry.
$H_5$: Forecast accuracy improves as size of firm increases.
$H_6$: Forecast accuracy is inversely associated with firm systematic risk.

The pre-test expectations above in the main reflect the apparent weight of US evidence regarding each hypothesis. As this extensive US literature has been reviewed numerous times, that exercise is not repeated here.[1] The one exception is the pre-test expectation on $H_2$, where US findings are especially mixed, and where further UK evidence cited by B&M, along with their UK-specific findings, are compelling at least in pre-test terms. Also noteworthy are B&M's findings contrary to the above: 'much better' accuracy on 9–12 months forecasts than for shorter periods ($H_3$); poor accuracy for large firms ($H_5$); 'no clear relationship inversely relating forecast accuracy to increasing systematic risk could be identified' ($H_6$).

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*The author is professor of accounting, School of Accounting, Oklahoma State University. He thanks Ian Bird and Lisa Gilbert, for data gathering and computing assistance respectively, and Jim Boatsman, Lanny Chasteen, Jim Groff, Chuck Ransom, Tom Wetzel, and particularly two anonymous referees for helpful comments on earlier drafts of this paper.

[1] For dedicated reviews of the earnings forecast literature see Abdel-khalik and Thompson (1978); Richards and Fraser (1978); Westwick (1983); Givoly and Lakonishok (1984); Brown, Foster and Noreen (1985). Reasonable within-studies summaries encompassing the UK literature include B&M (1984) as well as Klaassen and Schreuder (1982).

## Samples and models

Wells Fargo Ltd published monthly, from 1980 to mid-1983, an investment advisory service titled *Security Market Plane*, wherein historical information was provided for selected UK firms along with two forecasts of annual earnings for the next two annual results. These 'tax adjusted' forecasts consisted of an average of from 1 to 6 individual forecasts from brokerage firms contributing to the Wells Fargo (WF) service. In all instances, the December issue served as the data source for the study. Thus, two 'short-term' forecasts for the years 1980 and 1981 and one 'long-term' forecast for the year 1981, were available for study, accompanied by directly comparable[2] actual results for 1979, 1980 and 1981 included in the historical information provided (see Table 1).

Of the UK companies included by WF in December 1980, 126 were ultimately included in the study sample, with firms being excluded for the following reasons:

(1) The firm was not included in the WF portfolio throughout the necessary period for a complete, temporally-matched data set.
(2) Peculiarities associated with the WF data:
  (a) For firms forecasted to report a loss, WF simply reported zero, regardless of the loss per share expected. Firms for which a loss was forecast for either 1980 or 1981 were therefore excluded from the sample (6 firms). Similarly, firms reporting a loss were reported by WF at one penny, and these too were excluded (3 firms).
  (b) An apparent WF reporting error (1 firm).
(3) The firm was not among the top 1,000 UK firms in terms of size (5 firms). Beyond posing data gathering problems these were considered sufficiently numerous to possibly confound interpretation and generalisation, but too small in number to constitute a useful subsample.

For these 126 companies, company size (equity market value position), year end and industry groupings were determined from *Stock Exchange Companies 1983*. Firm Beta values taken from the London Business School's 'Risk Management Service' were also included in the WF service and were extracted for both 1980 and 1981. Finally, the WF forecast and actual EPS time series data were adjusted for the effect of stock splits/dividends.[3]

For comparative testing purposes ($H_1$), four naive models were employed. These were chosen to maximise comparability with US studies and the UK B&M study. Models 1 through 3 (see Table 1) are those of B&M, which also appear in a large number of prior US studies. Model 4 is a basic form of mean reversion where forecasted earnings are projected as the average of the current and preceding year's realised earnings, which takes into account the random independent element of earnings from year to year, while nevertheless anticipating that over time they will revert to an average level of growth. Only three of the prior US studies reviewed used this model in the short-run form here, but it has been widely used as a weighted average over a minimum of five years.

As to pre-test expectations for these models, on balance, prior research (e.g. Beaver, 1970; Ball and Watts, 1972; Albrecht, Lookabill and McKeown, 1973; Salamon and Smith, 1973; Watts and Leftwich, 1977) seems to suggest Model 2 (submartingale), an interpretation consistent with that of Beaver (1981, p. 126). However, Model 3 (a pure random walk) has proved either the best or among the best in numerous US comparative accuracy studies, and to the extent that the study period is characterisable generally as one of stagnation or decline, 'drift' during the sample period may be zero or entail negative growth. In the B&M study, none of the three models consistently ranked first in terms of mean error.

## Measurement and methods

Table 1 also presents the full set of error metrics employed in the present study. One major aspect of methodological variation across prior studies is the choice of error metric (error measure plus loss function) through which to assess accuracy/comparative accuracy, and as Brandon and Jarrett (1977, p. 45) note, it may be that '... measures of accuracy are not necessarily interchangeable'. Another is the choice between parametric or non-parametric analysis. In neither case is the choice obvious on *a priori* grounds. Accordingly, both parametric and non-parametric tests

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[2] Since the implementation of Statement of Standard Accounting Practice 15 on Deferred Tax in 1978, brokers have tended to adjust reported earnings to generate a figure of 'fully taxed earnings'.

[3] For one of the participating brokers in the WF sample, Wood MacKenzie, an additional sample of short-term forecasts for 52 (1980) and 58 (1981) of the 126 sample firms was drawn similarly from their publication *Equity Market Analysis*. In the interests of parsimony, results on this sample are reported only where further insight regarding hypotheses was obtained.

**Table 1**
**Summary of Study Variables**

*Wells Fargo Forecasts (F) and Results (A)*

$F^{wf}_{it}$ ($i = 1$ to 126; $t =$ 1980/1980, 1981/1981; 1981/1980)
$A^{wf}_{it}$ ($i = 1$ to 126; $t =$ 1979, 1980, 1981)

*Naive Model Forecasts (Models 1–4)*

$F^1_{it} = (A_{it-1})^2/A_{it-2}$ $\quad F^3_{it} = A_{it-1}$
$F^2_{it} = 2(A_{it-1}) - A_{it-2}$ $\quad F^4_{it} = (A_{it-1} + A_{it-2})/2$

*Error Metrics*

| | *Type f* | *Type a* | *Errors* | |
|---|---|---|---|---|
| (Signed) *s* | $\dfrac{F_{it} - A_{it}}{F_{it}}$ | $\dfrac{F_{it} - A_{it}}{A_{it}}$ | $E^f_s$ | $E^a_s$ |
| (Absolute) *a* | $\left\lvert\dfrac{F_{it} - A_{it}}{F_{it}}\right\rvert$ | $\left\lvert\dfrac{F_{it} - A_{it}}{A_{it}}\right\rvert$ | $E^f_a$ | $E^a_a$ |
| (Squared) *q* | $\dfrac{(F_{it} - A_{it})^2}{F_{it}}$ | $\dfrac{(F_{it} - A_{it})^2}{A_{it}}$ | $E^f_q$ | $E^a_q$ |

were used throughout, and except in the case of $H_2$ (where signed relative error is called for) all four of the unsigned error metrics were used.

For interpretation and reporting purposes subsequently, principal reliance is placed on absolute error relative to forecasted earnings ($E^f_a$) in parametric analysis and upon absolute error relative to actual earnings ($E^a_a$) in non-parametric analysis,[4] with reference to squared error ($E^f_q$ and $E^a_q$) for further insight into the *nature* of significant differences and relationships. In turn, principal reliance is placed on non-parametric analysis for disclosure of the *existence* of such statistically significant differences or relationships, with parametric analysis referenced for further insight into the *strength* of differences and relationships. The basic result is primary emphasis on absolute error and upon non-parametric tests, which is consistent with the use of absolute error in more recent studies. Also, absolute error is a neutral measure of 'pure' accuracy. Until more becomes known regarding how analysts' forecasts are actually used, that is the 'value' of error becomes clearer and our ability to distinguish instrumental from statistical significance enhanced, choice of absolute over squared error would seem appropriate. As to emphasis on non-parametric tests of hypotheses, this is consistent with the actual impact error that metric choice was found to have in the study, which is considered in the next section.

## Analysts v models (H1)

Table 2 presents the comparative performance of the analysts and the four models examined, for 1981 forecasts made in 1981, and for the remainder of the analysts' forecasts where Model 3 (random walk) is used as the benchmark, in terms of the four unsigned relative error metrics typically employed in forecasting studies. The left-hand side of the table shows the various forecasts ranked in terms of mean error and the 'best' (F′) and 'next best' or analysts' forecasts (F″), as well as the significance level of mean differences between F′ and F″. The right-hand side of the table presents the same thing, this time in terms of Friedman rankings. Also shown are the Pearson and Spearman correlation matrices for the four error metrics. Immediately evident is the material impact of error metric choice on the parametric means-based analyses, all the more striking when it is noted that the sampling procedures in the present study (see 2(a) above) can be expected to have reduced the incidence of extreme values from that likely to be the case in the typical forecasting study.

For example, focusing upon mean error, if absolute error relative to forecast earnings is used, Model 4 appears the best model and the analysts are judged to be significantly more accurate at the

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[4] There is a practical problem with using actual earnings as the measurement base, since such measures are materially distorted when actual earnings are near zero. Thus when the choice is to preserve the potential additional information content of interval measurement through the use of parametric methods, use of $E^f_a$ seems appropriate. Yet it is also difficult to circumvent the Lorek (1979) argument that the use of forecasted earnings as a base implies measurement of a firm's ability to achieve a predicted result, rather than a predictor's ability to forecast an outcome. In non-parametric analysis, however, substitution of ordinal for interval scaling should itself serve to suppress the impact of outliers and other distributional properties, which suggests use then of the conceptually preferable $E^a_a$ measure.

**Table 2**
**Analysts Versus Naive Models ($H_1$)**

| | *Means Ranking* | | | | *Friedman Ranks* | | | |
|---|---|---|---|---|---|---|---|---|
| | $E^f_a$ | $E^a_a$ | $E^f_q$ | $E^a_q$ | $E^f_f$ | $E^a_a$ | $E^f_f$ | $E^a_a$ |
| *1981/1981* | | | | | | | | |
| Wells Fargo ($n = 126$) | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 |
| Model 1 | 5 | 4 | 5 | 4 | 4 | 4 | 4 | 4 |
| Model 2 | 4 | 5 | 2 | 5 | 5 | 5 | 5 | 5 |
| Model 3 | 3 | 2 | 4 | 1 | 2 | 2 | 2 | 2 |
| Model 4 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 3 |
| F′ | $F^{wf}$ | $F^{wf}$ | $F^{wf}$ | $F^3$ | $F^{wf}$ | $F^{wf}$ | $F^{wf}$ | $F^{wf}$ |
| F″ | $F^4$ | $F^3$ | $F^2$ | $F^{wf}$ | $F^3$ | $F^3$ | $F^3$ | $F^3$ |
| t probability | 0.029 | 0.212 | 0.912 | 0.224 | | | | |
| Wilcoxon probability (all models) | | | | | 0.000 | 0.002 | 0.001 | 0.002 |
| Wilcoxon (F′/F″) | | | | | 0.005 | 0.008 | 0.012 | 0.008 |
| *1980/1980* | | | | | | | | |
| Wells Fargo ($n = 126$) | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 |
| Model 3 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 |
| *t* | 0.000 | 0.768 | 0.011 | 0.474 | | | | |
| Wilcoxon | | | | | 0.101 | 0.101 | 0.101 | 0.101 |
| *1981/1980* | | | | | | | | |
| Wells Fargo ($n = 126$) | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Model 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| *t* | 0.606 | 0.005 | 0.526 | 0.114 | | | | |
| Wilcoxon | | | | | 0.058 | 0.004 | 0.008 | 0.004 |
| | *Pearson* | | | | *Spearman* | | | |
| Correlation ($n = 252$) | 1.00 | 0.47 | 0.73 | 0.37 | 1.00 | 0.99 | 0.94 | 0.94 |
| | 0.47 | 1.00 | 0.81 | 0.97 | 0.99 | 1.00 | 0.94 | 0.95 |
| | 0.73 | 0.81 | 1.00 | 0.78 | 0.94 | 0.94 | 1.00 | 1.00 |
| | 0.37 | 0.98 | 0.78 | 1.00 | 0.94 | 0.95 | 1.00 | 1.00 |

0.03 level. Switch to the quadratic loss function here, and Model 2 appears best, with the analysts not judged superior at any reasonable level of statistical significance. Likewise, if the 1980 'short-term' forecasts are the focus of attention, these would be judged significantly better than Model 3 if absolute error relative to forecasts earnings is the measure; however, if actual earnings are used as the measurement base, then the analysts would not be judged significantly (0.768) better. The exact opposite is the case if the 'long-term' 1980 rather than the 'short-term' 1980 forecasts are the referent. Indeed, further analysis (not shown) in terms of mean error differences between the analysts and the best performing Model 3 served to confirm this impact of error metric choice. In fully eight of ten comparisons of means the differences were or were not statistically significant at the 0.05 level depending upon whether forecasted or actual earnings was used as the base for relative error measurement.

Also clear from Table 2 is that all such inconsistencies disappear once the focus of analysis is shifted away from means and parametric tests to forecast accuracy rankings and non-parametric tests, with Model 3 found to perform consistently best among the four models examined. Yet it should be noted that in tests of subsequent hypotheses, choice of error metric (alone or in concert with choice of parametric or non-parametric analysis and choice of data partitions) was found to make a difference as to whether a statistically significant relationship or difference was disclosed, and *both* parametric and non-parametric analyses were affected (though the latter again less so).[5]

These findings, while supportive of the previous choice to emphasise non-parametric analysis in the testing of hypotheses, are also of wider significance. That is, findings of prior studies exhibit considerable inconsistency regarding both analyst and management forecasts, and only partial success has been realised in reconciling them (e.g. Armstrong, 1983). Regarding Financial Analysts' Forecasts (FAF) in particular, after extensive review Givoly and Lakonishok (1984) conclude that 'research on the accuracy of FAF has been surprisingly inconclusive'. They further hypothesise, based on the high correlation between error measures observed in prior studies, that '. . . it is unlikely that conflicting conclusions are due to the use of different error measures by different studies'. Here, however, it appears that the intercorrelations between error metrics shown are *not* sufficiently high to avoid an impact from error metric choice on the results obtained from parametric tests of comparative accuracy between the analysts and models studied. This, along with the numerous examples of conflicting signals observed throughout the present study, suggests that the 'surprisingly inconclusive' character of FAF research may in fact not be all that surprising.

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[5] For example, in 188 cases of between-tests pairs of univariate parametric and non-parametric test statistics matched by error metric, 66 entailed conflicting signals at the 0.10 level of significance. Within-tests pairs of absolute and squared error statistics matched by actual versus forecasted earnings base, generated 59 cases of conflicting signals between loss functions.

Nevertheless, presumably through the suppression of the effects of outliers and of different distributional properties associated with the error metrics themselves, comparative accuracy rankings are, in turn, quite highly correlated and the impact of error metric choice is eliminated from the non-parametric tests. Based on these tests the results of the study support the proposition that UK analysts' forecasts outperform those generated from simple extrapolative models, with one important qualification: this conclusion was not justified for the 'long-term' (greater than 12 months ahead) projections studied. Comparison between the 126 Wells Fargo long-term 1980 forecasts of 1981 earnings, and the best performing Model 3, indicated no greater accuracy than that obtainable by merely projecting next period earnings equal to current earnings.

This poor performance of the longer-term forecasts can be seen in the Table 2 non-parametric test results. In all cases, across all error metrics, statistically significant superior performance is indicated for the random walk model. The more reserved conclusion of lack of superiority, rather than the inferiority indicated, is called for since the tests as constructed are biased somewhat in favour of the model. Earnings for 1980, rather than for 1979, were used for the Model 3 forecasts, where in fact 1980 results would not have been available at the time of the WF forecasts (December 1980). Use of 1979 earnings, however, would introduce an opposite bias, since interim 1980 earnings results were presumably available to the analysts in many cases but could not be incorporated to form more instrumentally comparable Model 3 forecasts due to lack of appropriate data. Given the preponderance of December and earlier year-end firms in the sample, tending to reduce the magnitude of temporal inconsistency, the bias inherent in using 1980 earnings was considered likely to be less severe than that associated with use of 1979 earnings.

The short-term analysts' forecasts did however exhibit reasonably clear superior accuracy, which is evident in Table 2. The superiority of the forecasts, for both 1980 and 1981, is statistically significant at the 0.10 level or better in the non-parametric tests across all error metrics. Also, with few exceptions, the forecast error distributions across error metrics exhibited lower standard deviation and skewness than the models. Further data analysis also confirmed the superior performance of the analysts over the models. For example, in 41% of the cases the 1981 short-term WF forecasts rank first among the five sources of earnings predictions examined. Further confirmation of the foregoing findings was found in the $E^f_s$ results vectors. On average (1980 + 1981), 65% of the short-term consensus analyst forecasts were found to be within ±15%, compared with 46% for the benchwork Model 3 forecasts. The poor absolute and comparative performance of the long-term forecasts also becomes clearer in such terms. With these, only 35% ($E^f_s$) were found to be ±15%, compared with 36% for Model 3, and compared with the 65% average above for the short-term forecasts.

## Estimation bias (H2)

A quite opposite estimation bias from that observed by B&M was found. Whereas 63.1% of their short-term consensus forecasts entailed earnings underestimation or negative forecast error, 59.9% of the short-term WF forecasts entailed overestimation or positive forecast error. Inclusion of the long-term WF forecasts ($n = 378$) raised the proportion of forecasts for 1980 and 1981 involving positive error to 64%. Thus the results did not replicate the B&M findings but were instead consistent with over-optimistic predictions.

Further, decomposition of the results indicated that the observed overestimation was not temporally stable. For example, the $n = 252$ sample showed positive/negative error proportions of 73%/27% for 1980, and the long-term forecasts made in 1980 exhibited the exact same proportions. However, the proportions for the $n = 252$ sample for 1981 were 46%/54%. Moreover, temporal and across-samples variation in the observed error distributions (in terms of means, standard deviations, skewness and kurtosis) was generally pronounced.

Taking this study's findings and the B&M study findings together, two conclusions appear warranted. First, the findings are more consistent with 'a general inability to forecast a systematic factor affecting the profitability of all companies' than with the presence of a material systematic impact of behavioural attitudes or of particular forecasting procedures shared by analysts (see B&M, p. 115). Secondly, the findings are consistent with the Brown, Foster and Noreen (1985) conclusion that; 'the overall impression from the literature is that when multiple forecasts are drawn over an extended time period, there is no evidence of a sizeable systematic bias in security analyst earnings forecasts'.

## Determinants of accuracy (H3–H6)

The large number of tests run involving multiple samples, error metrics and data partitions preclude a full presentation of results. Accordingly, Table 3 presents a representative sample of univariate test results on the remaining hypotheses. As shown, both parametric analysis of variance (Anova) and non-parametric Kruskal Wallis (KW) one-way analysis of variance were used. In the former case, F statistics/significance/variance explained is presented; in the latter case Chi-Square statistics/significance. Likewise, both Pearson and Spearman correlation were used, and $r$ coefficients/significance thereof are presented in Table 3.

*Forecast Interval* (*H3*). Table 3 presents results for the full WF sample so as to include the forecasts for more than twelve months ahead. Both the non-parametric and parametric results shown are statistically significant, in the latter case suggesting that above 4% of the variance is explained by forecast interval. Also clearly evident is that the long-term/short-term distinction dominates the results, and both Scheffe and Tukey tests confirm that only pairing with the long-term forecasts group produces statistically significant differences (0.05). Similar results were obtained for all the tests conducted on the remaining error metrics.

To assess whether a finer distinction than merely that between long-term and short-term appeared relevant, 3-group tests dropping the long-term group were run. Here the KW non-parametric models did not indicate the temporally grouped forecasts were significantly different, but the actual earnings-based error metric Anova models did, at the 0.04 and 0.06 levels. Moreover, consideration of the additional single-broker sample (see footnote 3) found the KW models on squared error to be highly significant (0.006, 0.007). These results

**Table 3**
**Univariate analyses**

*Forecast Interval* (*H3*)

| | *Short-Term Forecasts* *Aug–Nov* | *Dec* | *Jan–July* | *Long Term* |
|---|---|---|---|---|
| $N$ | 38 | 122 | 92 | 126 |
| $\bar{X}(E_a^f)$ | 0.145 | 0.164 | 0.165 | 0.254 |
| Anova$(E_a^f)$ | | 5.25/0.002/0.040 | | |
| Kruskal Wallis$(E_a^a)$ | | 35.50/0.0001 | | |

*Industry*(*H4*)

| | *i* | *ii* | *iii* | *iv* | *v* | *vi* | *vii* |
|---|---|---|---|---|---|---|---|
| $N$ | 38 | 36 | 34 | 42 | 38 | 34 | 30 |
| $\bar{X}(E_a^f)$ | 0.131 | 0.167 | 0.253 | 0.137 | 0.182 | 0.125 | 0.140 |
| Anova $(E_a^f)$ | | | | 1.36/0.232/0.032 | | | |
| KW$[E_a^a)$ | | | | 1.71/0.940 | | | |

*Size*(*H5*)

| | *1* | *2* | *3* | *4* | $(E_a^f)$ Anova $F/p/R^2$ | $(E_a^a)$ KW $Chi^2/p$ |
|---|---|---|---|---|---|---|
| $N$ | 62 | 64 | 62 | 64 | 3.25/0.022/0.038 | |
| $\bar{X}(E_a^f)$ | 0.122 | 0.118 | 0.226 | 0.181 | | 11.80/0.008 |
| $P-r/p$ | | | | | 0.079/0.212 | |
| $S-r/p$ | | | | | | 0.199/0.001 |

*Systematic Risk* (*H6*)

*Wells Fargo* ($N = 252$)/*B&M* ($N = 315$)

| *WF* | | ±*5%* | | ±*10%* | | ±15% | | *BM* |
|---|---|---|---|---|---|---|---|---|
| *N* | *Beta* | *WF* | *BM* | *WF* | *BM* | *WF* | *BM* | *N* |
| 1 | <0.6 | 0 | 33.3 | 100.0 | 66.7 | 100.0 | 100.0 | 6 |
| 16 | 0.6–0.8 | 18.8 | 23.1 | 31.2 | 38.5 | 62.5 | 53.4 | 52 |
| 71 | 0.8–1.0 | 28.2 | 31.1 | 53.5 | 38.5 | 67.6 | 55.4 | 74 |
| 100 | 1.0–1.2 | 26.0 | 35.5 | 49.0 | 57.0 | 65.0 | 68.1 | 135 |
| 56 | 1.2–1.4 | 32.1 | 31.1 | 55.4 | 46.7 | 66.1 | 60.0 | 45 |
| 8 | >1.4 | 12.5 | 66.7 | 37.5 | 100.0 | 50.0 | 100.0 | 3 |

Anova = 0.57/0.725/0.011 KW = 1.68/0.891 P = − 0.058/0.386
S = − 0.040/0.531 B&M r = 0.03

appear to support the pre-test expectation that analysts' forecast accuracy improves as length of forecast period declines, particularly as regards avoidance of larger forecast errors.

*Industry* (*H4*). Four different groupings of firms were employed to test $H_4$, consistent with the Magee (1974) caveat that results on industry effect may be sensitive to the breadth of industry categories employed. Table 3 presents the results obtained for a 7-group industry model, but a 9-group model gave similar results, with the best Anova here explaining approximately 3% of the variance with an F-statistic significant at only the 0.232 level. Results improved modestly for the two 3-group models used, with KW models at or approaching 0.10 on squared error metrics. Still, none of the Anova models indicated significant differences between the three industry groups. Movement to the $n = 378$ sample generated curious results: several significant Anova models but no significant KW models. Thus some weak but convoluted relationship between industry and accuracy appeared to reside in the sample, seemingly involving broad industry categories and the incidence of larger errors.

In general, the findings overall were similar to those of B&M, including differences in distributions being most obvious in squared error statistics (particularly with single-broker samples) and greater prediction difficulty for the heavy industrial sector over the consumer goods and services sector. However, where comparisons were possible, in only about half the instances did 'relatively good' and 'relatively poor' accuracy performance by specific industry categories match the B&M findings.

*Size* (*H5*). Various groupings of sample forecast errors were examined (5, 4, 3, 2 groups). Table 3 presents results for 4-group Anova and Kruskal-Wallis models, and in both cases the results are significant. Positive correlation is expected, since low firm size values coincide with large firms, and both the correlation coefficients exhibit the proper sign and the Spearman coefficient is highly significant. Comparable and consistent correlation coefficients for the $n = 378$ sample were $S_r = 0.167/0.0011$ and $P_r = 0.083/0.108$. The mean errors move in the expected direction with the exception of groups 3 and 4, suggesting that inappropriately fine distinctions were made between generally large firms making up the sample. Not surprisingly, movement from a 4-group model to a 2-group model improved the F and Chi$^2$ statistics from those shown to 8.52/0.004 and 10.96/0.0009. Similar and generally stronger results were obtained for the $n = 378$ sample.

Thus the pre-test expectation that accuracy increases with the size of firm was strongly supported. However, in only two instances, both with respect to the $n = 378$ sample, did significant KW models extend to squared error. In all other cases the KW model Chi$^2$ statistics were not statistically significant at the 0.10 level, none of the Anova models proved significant at this level, and the differences between F and Chi$^2$ statistics for absolute versus squared error metrics were striking. None of the correlation coefficients for squared error were significant, and in four of the six cases the coefficients were negative. These weak results on squared error, juxtaposed with the very strong results on absolute error, indicate that the firm size/forecast accuracy relationship relates to error generally and not especially to the incidence of large firm-specific errors.

*Risk* (*H6*). Table 3 employs the same Beta categories and presentational format as in the B&M study. Alternative 6-group and 4-group models, constructed toward more equal group sizes, were also employed. In addition, tests of the analysts' forecasts relative to the four models were rerun on errors deflated by Beta to assess whether differences disappeared as with Imhoff and Pare (1982) or were materially reduced.[6] Basically the results of all tests confirmed the B&M findings of no inverse association between analysts' forecast accuracy and firm systematic risk, contrary to the pre-test expectation.

As Table 3 indicates, on $E_a^f$ none of the results are significant, likewise on $E_a^a$ for the non-parametric tests, and negative rather than positive correlation was observed. This negative correlation was found across all error measures, data groupings, and samples. Indeed, the Spearman coefficients on squared error were generally significant throughout. Moreover, the Kruskal-Wallis models on squared error were consistently better than on absolute error and generally significant. Thus some evidence of systematic underestimation of larger earnings changes for lower Beta firms was present. However, if such a relationship between lower systematic risk and the incidence of larger error exists, it is likely to be an individually weak one, given that none of the Anova models were significant and no material changes in the comparative accuracy tests (models versus analysts) were noted as a result of deflating errors by Beta.

*Multivariate Analysis* (*H3-H6*). Multivariate analysis of variance was run on several of the alternative data groupings across all samples and error metrics, principally towards obtaining confirmation of the existence and strength of the relationships indicated by the univariate tests. In

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[6] B&M themselves note the difficult-to-discount findings, contrary to their own, of Barefield and Comiskey (1975a, 1975b, 1979) (see also Comiskey, Mulford and Porter, 1986). Imhoff and Pare (1982) also strongly supports the $H_6$ pre-test expectation, wherein significant differences between analyst, manager and model forecasts were found to disappear once error measures were standardised in terms of the prediction difficulty associated with the forecast series.

**Table 4**
**Multivariate Anovas**

| | *Model* | *Analysts* | *Time* | *Industry* | *Beta* | *Size* |
|---|---|---|---|---|---|---|
| Groups | $(E^f_a)$ | 1/2/3–4/5–6 | ST/LT | i–vii | 6 | I/II |
| $F$ | 3.29 | 4.73 | 16.70 | 1.95 | 0.66 | 13.25 |
| $p > F$ | 0.0001 | 0.0031 | 0.0001 | 0.0714 | 0.6511 | 0.0003 |
| $R^2$ | 0.141 | | | | | |
| | $(E^f_q)$ | | | | | |
| $F$ | 1.44 | 1.60 | 10.25 | 0.60 | 0.84 | 0.23 |
| $p > F$ | 0.1191 | 0.1900 | 0.0015 | 0.7295 | 0.5219 | 0.6299 |
| $R^2$ | 0.060 | | | | | |
| | $(E^a_a)$ | | | | | |
| $F$ | 1.64 | 3.02 | 2.21 | 1.44 | 0.23 | 5.15 |
| $p > F$ | 0.0577 | 0.0300 | 0.1380 | 0.1990 | 0.9509 | 0.239 |
| $R^2$ | 0.068 | | | | | |
| | $(E^a_q)$ | | | | | |
| $F$ | 0.88 | 1.86 | 0.58 | 0.89 | 0.12 | 2.03 |
| $p > F$ | 0.5884 | 0.1350 | 0.4465 | 0.5037 | 0.9875 | 0.1550 |
| $R^2$ | 0.038 | | | | | |

addition, multiple regression was run on those groupings which appeared most likely from the univariate tests to disclose linear relationships if they exist and are sufficiently strong and unconfounded to be disclosed by parametric methods. Since research suggests that increasing accuracy in consensus forecasts can be expected as the number of experts included increases (e.g. Winkler, 1971; Rowse, Gustafson and Ludke, 1974), number of analysts was included to control for this variable.[7]

Table 4 presents example Manova results for the $n = 378$ sample, which tend to confirm the previous findings and interpretations. That is, forecast interval and firm size once again appear to be significant determinants of analysts' accuracy. As heuristically expected, $E^f_a$ generated the more powerful model in terms of variance 'explained', and this held true for all samples. The models were rerun with interaction terms and none were found significant at the 0.10 level, though the Industry/Beta term approached this level ($E^f_a$, 0.128) indicating that these factors too may together play some deterministic role. That the number-of-analysts effect and the size effect are general/overall ones, whereas forecast interval relates particularly to the incidence of larger errors, is evidenced by the absolute versus squared error results in Table 4. The use of less fine groupings improved significance levels, except with industry (to 2 groups) where significance level fell. Multiple regression results were similar to that of the Manova results and likewise tended to confirm prior univariate findings.

## Conclusions and research implications

The results of the study indicate that UK analysts/broker-firms do outperform naive earnings prediction models, but only with respect to forecasts for periods less than twelve months ahead. As forecast interval increases, accuracy was found to decrease to a point where, for forecasts more than 12 months ahead, the analysts did no better and possibly worse than a simple 'no change' prediction. As neither more complex time series (e.g. Box-Jenkins) nor causal (rather than naive) forecasting models were examined, it remains for future research to determine to what extent the superior accuracy observed here is sustained in more competitive comparative accuracy contexts.

No evidence of the consistent underestimation observed by Bhaskar and Morris (1984) was found, and the study results suggest that the Brown, Foster and Noreen (1985) interpretation of US research, as indicating no systematic bias over the long term, can probably be generalised to the UK setting. As to determinants of forecast accuracy, firm size was found to be quite positively associated with greater overall accuracy, consistent with the notions of greater attention paid to, greater information being available for, and greater stability being associated with larger firms. Of further note, again with respect to overall accuracy as opposed to the incidence of large errors, a consistent return to aggregation of individual forecasts was found to exist at least through the six analysts limit encompassed by the study.

In contrast, forecast interval, while also found to be a determinant of forecast accuracy, was found principally to affect the incidence of larger errors. As to industry membership, as posited by Magee (1974), breadth of industry category definition did appear to matter in terms of results obtained. As to the results themselves, these prove the least subject to straightforward interpretation. Industry membership appears to matter, again regarding large errors especially, but exactly how remains unclear, with interaction with other variables possibly involved. Methodologically speaking, industry membership would appear a candidate for control in related studies; instrumentally there may exist an exploitable return to industry specialisation by individual brokers, a possibility suggested by the more pronounced accuracy variation across industry categories observed for the single-broker sample examined. Future research might accordingly be directed at definitively testing this specialisation hypothesis.

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[7] Indeed, additional tests of the impact of this variable found that accuracy increased consistently up through the six analysts limit in the study, with long-term forecasts more affected than short-term.

As to the risk variable, the positive association between firm systematic risk and forecast accuracy found by B&M was confirmed. This finding, taken in conjunction with the findings on the firm size variable, suggest the possible presence of systematic biases similar to those repeatedly documented across a wide range of experimental and non-experimental settings regarding subjective probability miscalibration (see e.g. Lichtenstein and Fischhoff, 1976). That is, the results are consistent with a systematic underestimation of the probability of material earnings changes for larger firms (lower probability events), systematic overestimation of the probability of large earnings changes for smaller firms (higher probability events) both in analysts' earnings forecasts and security markets' estimations of risk. Such hypotheses, the latter of market inefficiency, are readily amenable to future empirical testing.

Finally, this study found a significant and rather pervasive effect of research design choices, particularly error metric choice, on test results. Given on the one hand the considerable variation across prior studies observable in this domain, and this study's findings on the other, it becomes at least questionable whether past 'consistent' findings are in fact consistent, 'inconsistent' findings are actually inconsistent, or whether 'consistency' and 'inconsistency' are as often as not merely artifacts of alternative methodologies and research design choices. Further research seeking to replicate or refute the present study's findings would seem called for to establish the reliability of prior research in the area.

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# On Testing the Assumptions of the Cash Recovery Rate Approach to the Estimation of Economic Performance*

**Andrew W. Stark†**

**Abstract**—The first purpose of this paper is to investigate the necessary (as opposed to sufficient) assumptions underlying the CRR approach to the estimation of corporate economic performance. By so doing, the general circumstances in which an estimate of corporate economic performance based on CRRs will exactly equal a firm's IRR are identified. It is pointed out that these necessary assumptions are related to the concept of corporate economic performance being invoked (within the general idea that we are trying to estimate a firm's internal rate of return). Second, there is a drawing out of the empirical implications, as to the behaviour of corporate cash flows and CRRs, of the necessary assumptions for the CRR approach to produce an estimate of economic performance equal to a firm's IRR for each of these definitions of corporate economic performance. In particular, it is argued that these empirical implications depend upon the specific manner in which the CRR approach is applied in practice. A third purpose of the paper is to provide some empirical evidence as to whether an example of the practice of using the CRR approach employs data consistent with the necessary assumptions for this particular approach to be valid outlined in the paper. In fact, it turns out that this might not be the case. The evidence casts light on the extent to which CRR-based estimates of corporate economic performance are likely to be reasonable proxies of firms' IRRs.

## 1. Introduction

Whittington (1986, p. 16) states, in his overview of accounting theory, that it is '... important to understand to what extent and in what circumstances accounting measures will match some theoretical ideal which the user may be seeking, such as the internal rate of return'. The cash recovery rate (CRR) approach is one such method of estimating corporate economic performance (where the term economic performance is taken to mean, in this context, the economic, or internal, rate of return (IRR) being earned by the firm), and was first developed by Ijiri in a series of papers (Ijiri 1978, 1979, 1980). Subsequent to Ijiri's work, Gordon and Hamer (1988), Griner and Stark (1988a) and Salamon (1982, 1985, 1988) have refined the CRR approach. Salamon has expressed the view that, with the CRR approach, '... it is clear that we are closer than ever before to having an empirical measure of the profit performances of firms which is directly linked to a discounted cash-flow rate of return' (Salamon, 1982, p. 302).

Others have been less enthusiastic. Some criticisms have referred to technical aspects of applying the approach. For example, Stark (1987a) has shown that the CRR, as defined theoretically in the models of the firm used by Ijiri and Salamon, is generally impossible to observe when definitions of cash recovery and investment taken from Ijiri (1978) are used. Lee and Stark (1987) have further pointed out that the system of cash recoveries and investment flows defined in Ijiri (1978) is inappropriate for use in capital budgeting, casting further doubt on the definition of the CRR used in the empirical exercises in Ijiri (1978, 1979, 1980) and Salamon (1982, 1985, 1988). Lee and Stark (1987) and Stark (1987b) suggest the use of conventional cash flow definitions in applying the CRR approach.

Criticism of the model perceived to underly the CRR approach has also appeared. Brief (1985) has argued that an implication of the assumptions underlying the CRR approach is that cash flows should grow at a constant rate from the point in time when the firm reaches a steady state to the end of the life of the firm. He argues that until the issue of external validity of the approach has been addressed, the approach has no justification. More recently, Ismail (1988) has argued that in '... the theoretical modelling of the CRR–IRR relationship, a firm's CRR is assumed to be a constant over a period of time. It is the relationship between a constant CRR and the IRR that is used by Ijiri and Salamon to obtain empirical estimates of firm IRRs' (Ismail, 1988, p. 78). Ismail then investigates empirically whether the process generating the time series of a firm's CRRs over a period of twenty years is mean-reverting. He concludes that his evidence fails to support the hypothesis that CRRs are generated by a mean-reverting process over the twenty year period studied. As a result, Ismail suggests that the assumptions underlying the CRR approach are invalid, thus appearing to suggest that a necessary consequence of the assumptions underlying the CRR approach is that CRRs should be stable over a twenty year period.

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*This paper was inspired initially by a question asked by Dick Brief, in private correspondence dated February 19, 1988, as to what assumptions the use of the cash recovery rate makes about our knowledge about a firm's past, present and future cash flows. Hopefully the analysis of the paper provides some answers to this question. The helpful comments of Geoff Whittington, one of the referees, are acknowledged. Naturally, the normal caveat applies.

†Professor of Management Accounting at the University of Ulster at Jordanstown.

The first purpose of this paper is to investigate the necessary (as opposed to sufficient) assumptions underlying the CRR approach to the estimation of corporate economic performance. By so doing, the general circumstances in which an estimate of corporate economic performance based on CRRs will exactly equal a firm's IRR are identified. It is pointed out that these necessary assumptions are related to the concept of corporate economic performance being invoked (within the general idea that we are trying to estimate a firm's internal rate of return). Second, the empirical implications as to the behaviour of corporate cash flows and CRRs of the necessary assumptions for the CRR approach to produce an estimate of economic performance equal to a firm's IRR for each of these definitions of corporate economic performance are drawn out. In particular, it is argued that these empirical implications depend upon the specific manner in which the CRR approach is applied in practice. The work of Brief and Ismail is then evaluated in this light. Having correctly identified the empirical implications of the CRR approach as to the behaviour of corporate cash flows and CRRs, a third purpose of the paper is to provide some empirical evidence as to whether an example of the practice of using the CRR approach employs data consistent with the necessary assumptions for this particular approach to be valid outlined in the paper. In fact, it turns out that this might not be the case. This evidence casts light on the extent to which CRR based estimates of corporate economic performance are likely to be reasonable proxies of firm's IRRs.

The remainder of the paper is organised as follows. Section 2 considers three possible definitions of corporate economic performance. Section 3 contains an analysis of the necessary assumptions for the CRR approach to the estimation of economic performance to be valid (i.e., result in estimates of a firm's IRR equal to its true IRR) for each of the three definitions of economic performance considered in Section 2. Section 4 considers the empirical implications for the behaviour of corporate cash flows and CRRs of these various sets of assumptions (which, in fact, are identical). Section 5 applies the analysis of Section 4 in order to evaluate the comments and criticisms of Brief and Ismail with respect to the CRR approach. Section 6 considers the empirical practice of using the CRR approach which casts doubt on the assumptions underlying the CRR approach as it has been used in practice. Some directions for future research are suggested. The paper concludes with a brief summary of the main points made.

## 2. What can corporate economic performance mean?

Here we consider three out of a number of different possible definitions of corporate economic performance within the general idea that what we want to measure is a firm's IRR. Wherever possible, previous relevant work is cited where such a definition is referred to.

**Definition 1:** *The firm's economic rate of return is defined as the rate of return being earned by the projects (investments) of the firm that are active in some specified period under consideration. Thus, the internal rate of return is the interest rate which equates the present value of the costs of acquiring the active projects and the present value of the cash inflows that arise as a result of the active projects.*

Such a definition will produce an internal rate of return that represents a particular form of weighted average of the internal rates of return of each of the projects active in the specified period. It is a definition of a firm's internal rate of return employed by Solomon (1966, p. 234, 1970, p. 68). Naturally, unless all the active projects terminate in the period under consideration, any attempt at estimating a firm's internal rate of return, as defined above, for the period under consideration, will involve implicit or explicit estimates of future cash flows. These future cash flows stem from the specified period's active investments which are not due to terminate in the specific period. Perhaps more subtly, estimating the firm's internal rate of return, in this context, will also require estimating (or modelling), as opposed to observing, the past (i.e., prior to the specified period) cash flows stemming from the specified period's active investments. This is because firm cash flows in past years will have been affected by projects other than those active in the specified period. In general, it is impossible to observe the breakdown of these past firm cash flows into those cash flows that are associated with the specified period's active investments and those that are not (a point made previously by Solomon, 1966, p. 234).

**Definition 2:** *The firm's internal rate of return is defined as the appropriately weighted average of* ***all*** *of the firm's projects up to some specific date. This will, therefore, include both past projects and the projects active at the specific date. Thus, the internal rate of return is the interest rate which equates the present value of the costs of acquiring the past projects and those active at the specific date and the present value of the cash inflows that arise as a result of those projects.*

To apply this definition requires, as with our first definition, implicit or explicit estimates of the future cash flows associated with any project that does not terminate at the specified date. We can observe, however, at least in principle, all relevant past cash flows, given that, with this second definition, there is now no need to allocate past cash flows between those associated with current active projects and those associated with past terminated projects. Such a definition of a firm's internal rate of return is referred to by Wright (1978, p. 465).

**Definition 3:** *The firm's internal rate of return is defined as the appropriately weighted average of* ***all*** *the firm's projects over its entire lifetime. Thus, the internal rate of return is the interest rate which equates the present value of the costs of acquiring all projects and the present value of all the cash inflows that arise as a result of these projects.*

To apply this third definition of the firm's internal rate of return at some point in time prior to the date of the firm's liquidation, future cash flows have to be estimated for the projects that do not terminate at the specified point in time, as with the two other definitions. In addition, however, investment flows to take place after the specified point in time also need to be estimated, together with the cash flows that will arise in the future as a result of these investments. This is a definition of the firm's IRR implicit in the work of Kay (1976), and referred to in Edwards, Kay and Mayer (1987, p. 33).

Our discussion has suggested three possible interpretations of the term 'a firm's internal rate of return'. In the view of this author, the first definition is the most likely to be useful. Of the second definition, Wright (1978, p. 465) commented that one '... must doubt the relevance, for any contemporary purposes, of a single rate of return which represents the overall performance to date of a business firm founded in, say, the year 1900'. Edwards, Kay and Mayer (1987, p. 33) make similar comments about the third definition. The purpose of this section is not, however, to promote one definition of a firm's IRR over others. Rather, the purpose is set up some possible definitions of a firm's IRR in order to structure the discussion of the necessary assumptions required to translate a knowledge of a firm's cash recovery rate into an estimate of corporate economic performance for each of the three definitions given above.

## 3. Cash recovery rates and definitions of corporate economic performance

We start by considering an approach, based on corporate cash flows, to estimating corporate economic performance using the first definition given in Section 1 above, i.e., corporate economic performance, as measured in a specified period, represents a weighted average of the internal rates of return of the projects active in the specified period under consideration. At present, we shall also define the specified period as a year.

The firm is modelled in discrete time. Thus cash inflows and investment outflows occur at the end of the year. The period under consideration is denoted year 0. It is assumed that all active investments are identical (in terms of the sequence of cash inflows arising from these investments) other than in scale and age. Thus we can think of the firm as having, in the period under consideration, a typical firm project and, by so doing, we sidestep the issue of how to weight appropriately the internal rates of return of the various individual projects. Naturally, all of the investments made by the firm will have the same total life. The life of the project is represented by $N$. All active investments in year 0 must have been acquired between the end of year $-N$ and the end of year $-1$. Let $\{I(j)\}, j = -N$ to -1, denote the sequence of such investments. A cash flow profile associated with a unit investment in the typical firm project is then assumed. For the sake of argument, let the typical firm project cash flow profile be described by the function $a \sin(\pi i/N)$, where $i$ represents the number of years since the investment was made and $a$ is unknown at this stage. Let the firm's total cash inflow at the end of year 0 be represented by CF.

Given the model of firm behaviour given above, we can derive the following equation:

$$\begin{aligned} \mathrm{CF} &= I(-1)\cdot a \sin(\pi(1)/N) \\ &\quad + I(-2)\cdot a \sin(\pi(2)/N) + \cdots \\ &\quad \cdots + I(-N)\cdot a \sin(\pi(N)/N) \\ &= \sum_{t=1}^{N} a\cdot I(-t)\cdot \sin(\pi(t)/N) \qquad (1) \end{aligned}$$

Equation (1) 'counts up' the cash flows produced by the firm's active investments at the end of year 0, starting with the cash flows generated by the most recent investment ($I(-1)$) and ending with those generated by the oldest ($I(-N)$).

If $N$ can be estimated, and the sequence of investment over the past $N$ years is known, equation (1) can be solved for $a$. Given a value of $a$, an estimate of the IRR of a unit investment in the firm's typical project, and hence of the firm itself, can be produced by solving the following equation for $r$, where $r$ is the IRR:

$$1 = \sum_{i=1}^{N} a \cdot \sin(\pi i/T)/(1+r)^{i} \qquad (2)$$

This method of deriving an estimate of the internal rate of return of a firm merely requires a knowledge of the firm's cash flow (exclusive of investment flows) in year 0 and a knowledge of the investment flows over the past $N$ years.

If we are willing to assume that the sequence $\{I(j)\}, j = -N$ to $-1$, can be replaced by the sequence $\{I_0(1+g)^{j}\}, j = -N$ to $-1$, ($I_0$ being some constant), i.e., if we assume that investment has grown at a constant rate, $g$, over the past $N$ years, and we define the firm's CRR as the ratio of the firm's total cash inflows arising from the active investments in the year to the total cost of those active investments, then the following relationship holds:

$$\begin{aligned} \text{CRR} &= \sum_{t=1}^{N} a \cdot \sin(\pi t/N) \cdot I_0 \\ &\quad \times (1+g)^{-t} \Big/ \sum_{t=1}^{N} I_0(1+g)^{-t} \\ &= \sum_{t=1}^{N} a \cdot \sin(\pi t/N) \\ &\quad \times (1+g)^{-t} \Big/ \sum_{t=1}^{N} (1+g)^{-t} \qquad (3) \end{aligned}$$

The numerator of Equation (3) is equal to the firm's cash flow in year 0, when the annual rate of growth of investment over the period from year $-N$ to year $-1$ is a constant equal to $g$, divided by $I_0$. The denominator of Equation (3) is the sum of the costs of the investments active in year 0 (i.e., $I_0(1+g)^{-N} + I_0(1+g)^{-N+1} + \cdots + I_0(1+g)^{-1}$), also divided by $I_0$. Equation (3), then, is independent of the constant, $I_0$, and, hence, is independent of the level of investment but dependent on the rate of growth of investment, $g$.

Equation (3) can be solved for $a$, given estimates of $g$ and $N$, and the solution for $a$ can be inserted in equation (2) in order to derive an estimate of the firm's IRR. This is the essence of the CRR approach using a specified period of a year. With the specified year denoted as year 0, the CRR approach assumes in this case that the firm can be characterised as investing in a typical firm project from year $-N$ to year $-1$ and that investment can be characterised as having grown at a constant rate from year $-N$ to year $-1$. Naturally, as Salamon (1985) has pointed out, estimates derived from the CRR approach, and, indeed, the approach described above based on cash inflows, are conditional on the assumed shape of the cash flow profile associated with a unit investment in the cash flow profile (because the true cash flow profile is, in general, unknown). Further, it is sometimes possible to amalgamate equations (2) and (3) into a single equation relating $r$ to $g$, $N$, CRR, and other parameters of the assumed cash flow profile (as in, for example, Salamon 1982, 1985, 1988 and Gordon and Hamer, 1988). In general, however, such equations need to be solved by iterative procedures and, hence, the advantages of being able to compress equations (2) and (3) into a single equation are small from a practical point of view.

The analysis above assumes that the specified period is a year. It lends insight into the process whereby CRRs are translated into estimates of IRRs and the necessary assumptions underlying the validity of the approach if we are trying to implement definition 1 of the IRR given above. When we use data from some general specified period (a period which might be greater from a year), by extension, it can be seen that there are two (and only two) necessary assumptions to the CRR approach:

(A1a): the firm can be characterised as investing in a typical firm project in all the $N$ years prior to, and in all but the final year of, the specified period,

(A1b): investment flows over the $N$ years prior to, and up to the penultimate year of, the specified period can be characterised as having grown at a constant rate.

Now let us consider how we might go about estimating corporate economic performance as defined according to the second and third definitions given above. It is relevant to the estimation of corporate economic performance in accordance with both these definitions that, if the estimate of economic performance is based upon CRR data from some specified period (normally less than the total lifetime to date or total lifetime of the firm), such data can be affected only by the performance of the active projects in the specified period. It follows that the mechanics of applying the CRR approach will be the same whichever of the three definitions of economic performance is employed.

The second definition represents corporate economic performance as the weighted average of all of the firm's projects to date. Presumably, then, the necessary assumptions underlying the CRR approach are:

(A2a): the firm can be characterised as investing in a typical firm project in all the $N$ years prior to, and in all but the final year of, the specified period.

(A2b): the IRR of the projects completed prior to the specified period, taken together, is the same IRR as that earned by the projects active in the specified period.

(A2c): investment flows for the $N$ years prior to, and up to the penultimate year of, the specified period can be characterised as having grown at a constant rate.

Such assumptions say nothing about the way investment (and the cash inflows arising from such investment) will behave in the future, and relatively little about how investment behaved in the period more than $N$ years prior to the specified period (and the cash inflows arising from such investment).

Along the same lines, if we are trying to measure the firm's IRR in accordance with the third definition, i.e., corporate economic performance represents a weighted average of the IRRs of all past, current, and future investments, the underlying necessary assumptions for the CRR approach are:

(A3a): the firm can be characterised as investing in a typical firm project in all the $N$ years prior to, and in all but the last year of, the specified period.

(A3b): the IRR of all projects completed prior to the specified period and all future projects, taken together, is the same as that earned by the projects active in the specified period.

(A3c): investment flows for the $N$ years prior to, and up to the penultimate year of, the specified period, can be characterised as having grown at the same steady rate.

As can be seen, the necessary assumptions for the CRR approach to be applicable differ according to which particular definition of the firm's IRR is adopted. However, as is pointed out in the next section, some empirical implications of these assumptions for the behaviour of CRRs and corporate cash inflows are qualitatively the same.

It is worth pointing out that assumptions A2b and A3b, concerning the IRR of relevant projects which are not active in the specified period under definitions 2 and 3 of economic performance, are very strong. However, to assume that all such relevant investments which are not active in the specified period are the same as those active in the current period (i.e., are the same as the investments described in assumptions A2a and A3a) is sufficient, but not necessary, for assumptions A2b and A3b to hold. Further, it is doubtful whether these assumptions can ever be empirically validated in any general sense (although the author would be pleased to be proved wrong). This observation might well cast doubt *on the* validity of the CRR approach in this context. It should be observed, however, that similarly draconian assumptions are needed for the accounting rate of return (as conventionally defined using historical costs) to be a valid method of estimating economic performance under definitions 2 and 3 (opening and closing accounting book values for the period under consideration (at a minimum) need to equal the present value of relevant future cash flows using the relevant definition of the IRR of the firm as the discount rate).

## 4. Empirical implications of different cash recovery rate assumptions

Initially, let us again adopt the first definition of corporate economic performance. From above. in this circumstance the necessary assumptions underlying the CRR approach to the estimation of economic performance are that the firm has invested in a typical project for the $N$ years prior to, and up to the penultimate year of, the specified period, and that investment flows have grown at a constant rate over the $N$ years prior to, and during all but the final year of, the specified period. Given these assumptions, what are (and what are not) the empirical implications for the behaviour of corporate cash flows and CRRs of the CRR approach when applied in this context?

First, given that no assumptions are made about investment behaviour prior to the period of time $N$ years before the specified period, nor after the specified period, there is no reason to expect the cash recovery rate to have been stable in the years prior to the specified period under consideration or to be stable in the future. In other words, the necessary assumptions imply that the CRR will be stable only in the specified period. Second, the necessary assumptions imply that cash flows grow at a constant rate during the specified period, but do not imply that past cash flows have, and future cash flows will, grow at the same constant rate. If the two other definitions of economic performance are now considered, it can be deduced that the implications above will hold for both of these definitions of corporate economic performance. This results from the fact that only very limited (in the sense of detailed descriptions of the relationship between investment outflows and subsequent cash inflows) assumptions about investment in the period $N$ years prior to the specified period and, for the third definition, after the specified period, are necessary.

## 5. An analysis of Brief (1985) and Ismail (1988)

Brief (1985) argues that the assumptions underlying the cash recovery rate approach imply that, from a certain point in the firm's life onwards (that point in time $N$ years after the firm first acquires a typical firm project), cash flows will grow at a constant rate into the indefinite future. He does not specify any particular definition of the IRR. Given the three sets of necessary assumptions above, corresponding to three different definitions of economic performance, it would appear, however, that Brief is incorrect in his assertions.

There is no doubt, however, that by reading, for example, Ijiri (1979) and Salamon (1982), the impression could be gained that the CRR approach is based upon the idea that the firm has invested and always will invest in a typical firm project and, given a constant rate of growth in investment, will reach a steady state at a certain point in its life ($N$ years after the firm first acquires a typical firm project) at which time the CRR will stabilise and cash flows then grow at a constant rate. Hence, it is not entirely surprising that Brief expresses the concerns that he does. As, hopefully, has been made clear above, however, the assumptions necessary for such a steady state to be reached are *sufficient but not necessary* for the CRR approach to be valid under any of the definitions of economic performance given above.

The criticisms of Ismail (1988) are more complicated to deal with. As has been argued earlier, when applying the CRR approach to data from a specified period, the necessary assumptions underlying the approach, whatever the definition of economic performance invoked, imply that the CRR is constant over that period. Naturally, this is not strictly the case. Indeed, the problems involved in transferring an estimation technology based on deterministic modelling to an uncertain world have not been investigated. (Such problems would include how to determine the best size for the specified period—an issue too complex to be addressed in this paper.) Ismail (1988), however, appears to work on the basis that an implication of stability in a deterministic world will be taken to imply that CRRs should be mean-reverting (i.e., are stable other than through reasons of random error) in an uncertain world.

Given the above translation of conditions which should hold in a deterministic world into those that should hold in an uncertain world and the analysis of the previous section, the conclusion reached in Ismail (1988), i.e. that CRRs over a twenty year period do not appear to be, in general, mean-reverting, would appear to be of little *general* relevance to judging the quality of CRR based estimates of corporate economic performance if this is defined in any of the three ways given above. Naturally, if it is essential to assume that the firm has had a typical firm project for a substantial length of time (the life of the typical firm project plus 20 years), whether employing definitions one, two or three of economic performance, Ismail's results are disturbing. However, identifying circumstances under which such an assumption is essential is not a clear-cut task (the circumstances will depend upon the optimal choice of specified period).

Presumably, therefore, given the arguments above, a more relevant question to ask is: are CRRs mean-reverting over the specified period used to calculate a CRR to be employed in the estimation process described by equations (2) and (3) above? In fact, Ismail's work can be interpreted as suggesting, from an empirical point of view, that if a twenty year specified period is chosen, CRR based estimates of economic performance would contain measurement error. To the extent that twenty year specified periods have not been used in practice, such a suggestion, in itself, is not of great interest, although it suggests the possibility that CRR based estimates employing a more normal length of specified period (e.g., five or seven years) might also contain such measurement error. Some empirical evidence that this might be so is provided in the next section.

## 6. Empirical evidence of properties of cash recovery rates

Evidence is given in this section as to whether CRRs behave, over a five-year specified period, in a fashion consistent with mean-reversion in the sample employed by Griner and Stark (1988a). The Griner and Stark sample consists of 307 firms taken from the Compustat tape. The sample represents all the firms on the Compustat tape that satisfied certain criteria. The main reasons for excluding firms that were on the Compustat tapes from the sample were (1) data availability and (2) failure to prepare the Statement of Changes in Financial Position using a working capital (current assets less current liabilities) definition of funds. Further details of the sample can be found in Griner and Stark (1988a).

For each firm in the sample, a CRR is calculated for each of the years 1976 to 1980. A cash flow based ratio is used (as opposed to the quasi working capital based ratio of Ijiri, 1978). Precedent for the use of such a definition for the CRR exists in Griner and Stark (1988a). Criticism of the Ijiri (1978) definition on *a priori* grounds can be found in Lee and Stark (1987) and Stark (1987a,b). We empirically define the CRR as the ratio of operating cash flow less taxes paid to the average of opening and closing gross fixed assets. Operating cash flow is defined in a fashion similar, but not identical, to the standard UK fashion, as in, for example, Lawson (1985). Where it differs is in including proceeds of sale of long-term assets in operating cash flow. Such a treatment of these sales proceeds seems more compatible with the CRR approach given that they do constitute cash inflows arising from previous investment flows.

If CRRs are mean-reverting, their time series properties can be modelled by the following equation:

$$\mathrm{CRR}_t = \psi + \omega_t \qquad (4)$$

where $E(\omega_t) = 0$, variance $(\omega_t) = \sigma^2_\omega$, and $\mathrm{cov}(\omega_t, \omega_{t-i}) = 0 \; \forall \; t, i \neq 0$. This then implies that

$$\mathrm{CRR}_t - \psi = \omega_t \qquad (5)$$

i.e., the departures of CRRs from their constant mean should be randomly distributed through time. Under such circumstances, the number of runs expected ($A_{\mathrm{runs}}$) in the time series of such departures (a run being a succession of departures from the mean of the same sign) is a random variable whose mean ($N_{\mathrm{runs}}$) is given by (Wald and Wolfowitz, 1940):

$$N_{\mathrm{runs}} = (2N_1(N - N_1)/N) + 1 \qquad (6)$$

where $N$ is the total number of data points in the time series and $N_1$ is the number of departures from the mean with positive signs. The set $\{N_1, N - N_1\}$ can take on four different values, if $N = 5$. These are $\{1, 4\}$, $\{2, 3\}$, $\{3, 2\}$ and $\{4, 1\}$. In the sample described above, 264 firms correspond to either $\{2, 3\}$ or $\{3, 2\}$ (each with an expected number of runs 3.4), while the remainder, 43 firms, correspond to either $\{1, 4\}$ or $\{4, 1\}$ (each with an expected number of runs of 2.6).

An expression can also be derived for the variance of the number of runs $(\sigma_{\mathrm{runs}})^2$:

$$(\sigma_{\mathrm{runs}})^2 = [2N_1(N - N_1)(2N_1(N - N_1) - N)/N^2(N - 1)] \qquad (7)$$

For firms with either 2 or 3 above average CRRs, $(\sigma_{\mathrm{runs}})^2$ equals 0.84. For firms with either 1 or 4 above average CRRs, $(\sigma_{\mathrm{runs}})^2$ equals 0.24.

$\sigma_{\mathrm{runs}}$ can be used to create a test statistic $(=(A_{\mathrm{runs}} - N_{\mathrm{runs}})/\sigma_{\mathrm{runs}})$ whose distribution closely approximates a standard normal distribution if $N_1$ and $(N - N_1)$ are 'sufficiently large'. 'Sufficiently large' requires that $N_1$ and $(N - N_1)$ both exceed 10 (Mendenhall and Reinmuth, 1971). Clearly, with only 5 data points per firm, it is not possible to test whether the actual number of runs for each firm is significantly different from that expected if CRRs are generated by a mean-reverting process over the specified period. Nor does it make much sense to provide the distribution of individual firm test statistics as in Ismail (1988) or, for example, in the context of the time series properties of earnings (Ball and Watts, 1972).

What can be provided is statistics on the number of firms with more (fewer) runs than expected and also a comparison of the aggregate number of runs across the sample with the aggregate expected number of runs. Out of the 307 firms, 149 (48.5%) had more runs than expected while 158 (51.5%) had fewer. For those firms with 1 or 4 above average CRRs, the likelihood of there being more runs than expected is 0.6. For those firms with 2 or 3 above average CRRs, the likelihood of more or fewer runs than expected is equal. Treating the number of firms with more runs than expected as a random variable, if individual firms' runs outcomes are independent and CRRs are mean-reverting, this random variable, by the central limit theorem, will be approximately normally distributed with a mean of 157.8 $(=43(0.6) + 264(0.5))$ and variance equal to 76.32 $(=264(0.5)(0.5) + 43(0.4)(0.6))$—remember that the variance of a variable distributed binomially is the product of the two outcome probabilities. Given the assumption of independence, the actual number of firms with more runs than expected is different from the mean by 1.01 standard deviations and, hence, it is not possible to reject the null hypothesis, using a 5% significance level, that CRRs are mean-reverting over the five year period.

The total number of runs for the sample is 987. Treating the total number of runs as a random variable, if individual firms' runs outcomes are independent and CRRs are mean-reverting, the total number of runs will be approximately normally distributed with an expected value of 1009.4 $(=264(3.4) + 43(2.6))$ and a variance of 232.08 $(=264(0.84) + 43(0.24))$. Given the assumption of independence, the total number of runs in the sample is different from the expected number of runs by 1.47 standard deviations and, again, it is not possible to reject the null hypothesis that CRRs are mean-reverting over the five year period at a 5% level of significance.

It is worth pointing out that, irrespective of the assumption of independence, the two tests performed above are rather crude and, under the circumstances, weighted against rejecting the null. Basically, the tests are of low power. On the other hand, such tests seem to be the only ones available and, hence, are used to give some insight into the properties of CRRs in the Griner and Stark sample.

The tests above, however limited they might be, depend upon the assumption of independence of individual firms' outcomes in terms of runs. If above/below average CRR outcomes are independent across firms in each year of the sample employed, then runs outcomes also will be independent across firms. If CRRs are generated by a mean-reverting process during the five-year period, and the error terms are independent across firms, the number of above and below average CRRs in each year should not deviate significantly from the number expected for each $(153.5 = 0.5(307))$. A significant deviation (using a 5% level of significance) occurs, in this context, if the number of above/below average CRRs is less than 136 or greater than 171 $(\approx 153.5 \pm 1.96[(307)(0.5)(0.5)]^{1/2})$, again by resort to the central limit theorem. For each year in the five year time period covered, the number of above and below average CRRs is calculated. In 1976, there are 156 below and 151 above average CRRs. For 1977, 1978, 1979 and 1980, the figures are 192 and 115, 168 and 139, 176 and 131, and 132 and 175, respectively. Thus, in 1977, 1979 and 1980, it appears that it is highly unlikely that deviations from mean CRRs are independent across firms in the sample. This, in turn, casts doubt upon the assumption of independence across firms of the number of runs in the five year period.

All of the above, taken together, appears to question whether CRRs are likely to be mean-reverting over a five year period. There appears to be a common element affecting corporate CRRs. The existence of such a common element, of itself, does not necessarily imply that CRRs are not mean-reverting. This will depend on the behaviour of the common element through time. Other interesting questions then arise. First, what is the source of the common element seeming to affect firms' CRRs? Two (not mutually exclusive) explanations suggest themselves initially. First, firm capital expenditures may have a common cyclical element. Second, firm aggregate cash inflows may be affected by common factors (e.g., the level of real GNP, interest rates, inflation, etc.). If the true explanation is the first of these, this has implications for use of the cash recovery *rate* approach, i.e., the constant growth assumption is violated. On the other hand, this paper has suggested an approach to the estimation of corporate economic performance, if sufficient data on past investment is available, which is not dependent on the constant growth assumption. If the second explanation, however, is also part of the overall explanation, this challenges the validity of the modelling of the process by which investment outflows are translated into subsequent cash inflows—a more fundamental challenge to using cash flow data to estimate corporate economic performance. The above suggests that research into the nature of the common element(s) seeming to affect corporate CRRs is important. Second, (1) what is the nature of the bias introduced into CRR based estimates of corporate economic performance (and those produced by other related methods) by such common elements and (2) if necessary, can the CRR approach (and other related methods) be modified to take into account such common elements affecting CRRs in order to provide better estimates of corporate economic performance?

It remains to point out that, even if CRRs are not generated by a mean-reverting process over the five year period studied, nor the twenty year period studied in Ismail (1988), this does not, of itself, invalidate the CRR approach, as described above, to the estimation of corporate economic performance, or the estimates of economic performance generated in Griner and Stark (1988a). As suggested above, it would appear that these estimates contain more measurement error than hitherto might have been supposed. (See Griner and Stark, 1988b, for other reasons why CRR based estimates of economic performance might contain measurement error.) Whether such measurement error is important depends upon its properties and the use to which the estimates of economic performance are put. (See Whittington, 1979, for a discussion of desirable properties in estimators of economic performance.) This highlights the importance of identifying the cause(s) of the common element(s) seeming to affect corporate CRRs. Further, Griner and Stark (1988a) present the results of tests which suggest that CRR based estimates of economic performance derived from the data used here, even in the presence of measurement error, are linearly related to firms' economic rates of return—a desirable initial attribute in an estimator of economic performance.

## 7. Conclusions

This paper seeks to make the necessary assumptions underlying the CRR approach to the estimation of economic performance in response to the issues raised by Brief (1985) and Ismail (1988) as to the approach's validity. The issues raised relate to the behaviour of corporate cash flows and CRRs implied by the CRR approach. It is argued that the necessary assumptions of the CRR approach do not, in general, imply the behaviour of cash flows and CRRs argued for by Brief and Ismail as implications of the CRR approach. In particular, the behaviour of cash flows and CRRs implied by the CRR approach will depend upon how the approach is applied. Strictly speaking, the approach implies that cash flows will grow at a constant rate and the CRR will be stable only over the specified period used to generate CRR for use in the estimation process. The stability of CRRs is then investigated over a specified period often used in practice when applying the CRR approach (five years) and doubt is expressed as to whether CRRs are, in fact, mean-reverting over this specified period. This suggests that estimates of economic performance derived from CRRs using five years as the specified period might well contain more measurement error than hitherto has been understood. While the existence of such measurement error does not, of itself, invalidate the CRR approach, an understanding of the properties of such measurement error clearly would help in understanding the extent to which, and under what circumstances, estimates of economic performance derived from CRRs are suitable proxies for economic performance itself.

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# A Note in Defence of the T Account

## Harold C. Edey*

In his paper on matrix-based accounting, Mepham (1988) suggests that the notion of the T account is now potentially damaging 'as it ties the conceptual model to a form of record keeping which is rapidly becoming obsolete'.

This criticism is, I suggest, based on a misconception in that it identifies the physical features of a particular accounting system, such as a database, with the symbolism which all accounting systems must have to indicate whether a given item is a debit or a credit.

It is often more convenient, when manipulating debits and credits, to use T accounts rather than plus and minus signs or matrix rows and columns. All three are essentially mathematical symbols, equivalent to one another. Each transforms into the others. Each has its use in particular contexts.

Furthermore, a traditional set of double-entry books can still serve better in some practical situations than a computerised database system can, so it would surely be unfortunate if the older forms were no longer taught. There is no conceptual conflict. Indeed, approaching from an historical angle, a database can be visualised merely as the modern form of a random-accessed Pacioli Memorial or Waste-book. If a trial balance is to be drawn from it, the database must contain inside itself elements which, taken together, comprise the structural form of a traditional double-entry system.

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*The author is emeritus professor at the London School of Economics and visiting professor at the University College of Wales, Aberystwyth.

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# Conjectures on the influence of the 1920s *Betriebswirtschaftslehre* on Sweeney's *Stabilized Accounting*

F. L. Clarke and G. W. Dean*

**Abstract**—The antecedents of Sweeney's *Stabilized Accounting* are early examples of responses to economic and political pressures. Sweeney's 1927 and 1928 works promulgating Goldmark Balance Sheets (Goldmarkbilanz) appeared, however, when the unique events (viz. hyperinflation and potential collapse of the Reich), which were the catalysts for backwards rescaling procedures of Goldmarkbilanz, had disappeared. Sweeney's writings *pre* and *post* 1928 differ markedly. Vacillations between indexation (backwards then forwards), historical cost, then replacement cost based stabilisation methods, which pepper his work, mirror the changing fortunes of Schmalenbach's, Mahlberg's and Schmidt's proposals. Sweeney's legacy is twofold: (i) the popularisation of indexed accounting, particularly in Anglo-American countries, and (ii) recognition of the need to couple a homogeneous (stable) unit of measure with a function of accounting which was to provide a measure of an entity's command over goods and services and any changes therein.

It is now over fifty years since the publication of Sweeney's *Stabilized Accounting* (*SA*), and over sixty years since his first publication on stabilised accounting and the completion of the 'first final draft' of *SA*. By virtue of these anniversaries and the significance so often attributed to Sweeney's work the time is opportune for a reassessment of Sweeney's contribution to the inflation accounting debate in the Anglo-American literature.

In this literature Sweeney has been acknowledged as leaving a large legacy (e.g. Littleton, 1936, p. 298; Littleton and Zimmerman, 1962, p. 188; Hendriksen, 1965, p. 59; Whittington, 1980, p. 236; Buckmaster, 1981, p. 126 and Tweedie and Whittington, 1984, pp. 262–63). Whittington (1980, p. 236), for example, describes Sweeney's work as 'a masterpiece' and 'one of the most substantial theses ever written in accountancy'. This paper assesses that legacy, and begins to piece together the myriad factors influencing the development of Sweeney's *SA*. In the process we provide possible reasons for the change in Sweeney's method of stabilised accounting in his *post* 1928 works.

It is the received wisdom in the literature that Sweeney's *SA* was the product of compromise. Without indicating degrees of influence Sweeney acknowledges the numerous individuals influencing his work (1964, pp. xxii–xxxix). These included economists such as Fisher and Marshall with their respective views on stabilisation, and capital being indicative of purchasing power; accountants suggesting stabilised measures in accounts such as Middleditch; other accountants concerned with incorporating values rather than costs such as Paton, Paton and Stevenson, Rorem, Daines as well as Kester, Sweeney's supervisor. It was Kester who continually stressed the need for a *practical* solution to the measurement problem. European influences, especially those from the German *Betriebswirtschaftslehre*[1] movement, were also noted by Sweeney (1964)—Mahlberg, Schmidt and Schmalenbach were identified specifically. Others mentioned, also from Germany, were Prion, the aptly named Geldmacher [money maker], Strutz and Nimax; whilst from France, inter alia, Leger, Valois and Faure were cited in the text.

Searching beyond this listing in an attempt to identify the major influences on Sweeney is obviously a difficult task. Unravelling such complexities is inherent in any historical research. Some speculation based upon the circumstantial evidence is in order. Notwithstanding Sweeney's acknowledgement of the European influences on his stabilization proposals, the extent of the influence of two German *Betriebswirtschaftslehre* theorists, Mahlberg and Schmidt, is not well understood in the accounting literature. An

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*The authors are, respectively, professor of accounting at the University of Newcastle and senior lecturer in accounting at the University of Sydney.

[1] *Betriebswirtschaft* is the theory of business economics, whilst *Betriebswirtschaftslehre* means the business economics movement (theorists). For a description of two leading *Betriebswirtschaftslehre* theorists see Clarke and Dean, 'Schmidt's *Betriebswirtschaft* Theory', (1986) and Graves (1989) on Mahlberg.

exception is the work of Graves (1985, 1987 & 1989). But, in contrast with Graves, it is posited here that Schmidt had an equal if not greater influence on Sweeney than Mahlberg. Furthermore, this analysis should placate concerns, such as those expressed by Tweedie and Whittington, that Sweeney's pragmatic 'preference for replacement cost over other current values is not fully explained' (1984, p. 34).

There are considerable grounds supporting the view that Sweeney's legacy is *largely* misrepresented, at best seriously misunderstood (Clarke, 1976a, pp. 265–67). Clarke argued that Sweeney had been subjected to 'distorted descriptions of both stabilized accounting and what [he] was trying to achieve' (p. 265). Further supporting evidence to that effect is presented here. Recourse to translations of the original German material allows the inference that the apparent anomalies between Sweeney's *pre* and *post* 1928 writings were consequences of the vicissitudes of the European economic and political circumstances upon which he drew. For little of what he presented was original. The assertions that Sweeney *synthesised and extended* the German price change accounting during the 1920s hyperinflation (Graves, 1985, p. 166) are substantially justified. Contrary to Sweeney's suggestion that his stabilised system of accounting was the product of compromise, possibly reflecting Kester's and others' penchant for practicality, it appears much more likely that it was a compromise based on several 1920s German *Betriebswirtschaftslehre* models. Strong evidence suggests that stabilised accounting was more the product of acquiescence to political expediency than the outcome of an analytical development of accounting thought. Specifically, additional evidence is adduced casting doubt on Graves' claim that 'the German gold-mark model [was] the model that apparently most inspired Sweeney' (1987, p. 35). Graves is too general by far. Although not questioning this proposition in respect of Sweeney's *pre* 1928 works, his latter works were the product mainly of the ideas of *Betriebswirtschaftslehre* theorists, Mahlberg and Schmidt and Schmidt's criticisms of Sweeney's *pre* 1928 stabilized system. In particular, evidence is produced suggesting that Schmidt's influence has not been recognised properly in the Anglo-American accounting literature. Recourse to an economic consequences explanation makes the differing inferences subsequently drawn from Sweeney's work explicable.

A possible explanation of how Irving Fisher's stabilisation concept was transported from the economics literature by Sweeney into the accounting literature, is outlined in the first part of this paper. Section 2 focuses upon Sweeney's works *pre* 1928 and suggests that these early explorations merely resulted in the transportation of Goldmark balance sheet accounting (*Goldmarkbilanz*)[2] into the Anglo-American literature. Sweeney's *post* 1928 works and the complex of political, economic and accounting forces affecting them are examined in section three. It explores the possibility that the ideas of Schmidt and Mahlberg played a substantial part in the forging of Sweeney's ultimate *SA* by the mid-1930s. At this juncture it is necessary to examine Sweeney's views on capital and capital maintenance, in particular highlighting his preference for a 'real' as opposed to a 'physical' capital concept. The final section summarises our assessment of Sweeney's legacy.

## 1. Stabilisation and Sweeney

### (i) *Stabilisation and Stabilising Accounts*

The process of currency stabilisation has a long history. Its modern resurrection before and after World War I was by monetary theorists, in particular Irving Fisher in *The Purchasing Power of Money* (1st ed. 1911, 2nd rev. ed. 1922), *The Stabilisation of the Dollar* (1920) and *The Money Illusion* (1925). (For further details see Clarke, 1982, pp. 31–36.) Fisher's recurrent theme is well captured in the last paragraph of *The Stabilisation of the Dollar*:

> [Over time] the deeper will grow the public conviction that our shifting dollar is responsible for colossal social wrongs . . . all the more . . . because these wrongs are usually attributed to other causes . . . the . . . dollar is the great pickpocket—robbing . . . billions of dollars a year, confounding business calculations, convulsing trade, stirring up discontent, fanning the flames of class hatred, perverting politics and, withal, keeping its sinister operations out of sight and unsuspected. (1920, p. 305)

Seicht (1982, pp. 108–109) noted the early recognition by European business theorists of distortions in monetary calculations due to changing money values. He also suggested that, in *The Purchasing Power of Money* (1911), Fisher had alluded to the existence of *fictitious profits* in traditional accounting. The appearance of this seminal work in German in 1916 (*Die Kaufkraft des Geldes*) led to an awakening of some (and a reinforcement of other) *Betriebswirtschaftslehre* theorists' sensitivities to the price level problem. This reference to Fisher is consistent with the Anglo-American view of the importance of

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[2] *Goldmarkbilanz*—Gold mark balance sheet or gold mark accounting—is used widely in the German hyperinflation accounting literature. In principle it refers to any backwards adjusting indexed accounting methods involving a restatement of post-World War I financial reports in terms of pre-war (i.e. 1914) values. Graves (1987) describes the theory underlying the German gold mark models of Mahlberg and Schmalenbach.

Fisher's work (for example, Tweedie and Whittington, 1984, pp. 17–18). The work of others, in particular, Schmalenbach (1921, p. 12), Osbahr (1923, p. 58) and Sewering (1925, pp. 28 & 66), who appeared cognisant of the accounting distortions of the kind Fisher highlighted, also captured Seicht's attention. In this setting, proposals by German business theorists to stabilise accounting data might be regarded a predictable by-product of interrelated factors: the general economic climate (inflation), the national monetary concern to rectify the fluctuating (destabilised) German currency, Fisher's and others' observations on the need to settle (stabilise) the German mark, and Fisher's and others' exposure of fictitious or paper accounting profits.

Following the onset of *post* World War I inflation, suggestions by German businessmen that everyday commercial transactions ought to incorporate stabilisation factors were common; particularly so with respect to wage, price and credit arrangements (Holtfrerich, 1985, p. 185). In this climate it is understandable that stabilising or equalising accounting data were promoted vigorously in the German *Betriebswirtschaftslehre* literature. Business economists, such as Mahlberg (to whom Sweeney acknowledged being indebted), had used the term, stabilisation (Mahlberg, 1923a, p. 33 & 1923b, p. vi). By the mid-1920s stabilisation was in common usage, both as a term connoting an equalisation of money units in terms of general purchasing power and as a label applied to various accounting restatement, or scaling, procedures to achieve it (Clarke, 1982, p. 94). But it had no unique accounting orientation. The orientation was *monetary calculation*. As such, the notion of stabilisation inevitably drifted into the development of accounting mechanisms.

### (ii) *Sweeney's Stabilising—Seminal or Evangelical?*

The avowed purpose of Sweeney's stabilised accounting was:

> to make accounting data more accurate by removing much of the effect of fluctuations in the value of the money unit . . . to keep inflation from distorting accounting figures and from thereby misleading managements which must rely on such figures to guide enterprises safely. (1935, p. 185)

Stabilised accounting, he contended, would result in *measures* of all accounting items in homogeneous terms. A notion of meaningful monetary, financial calculation clearly was at the heart of the matter. Interested parties, he argued, would be able to determine from stabilised accounting data whether the 'customary main object of economic activity . . . increased command over economic commodities and services in general' (i.e. an increase in purchasing power, 1935, p. 185) had been achieved. Specification of the 'customary object of economic activity' has been noted earlier in his articles on the topic (1930, pp. 277 & 287; 1933, p. 193; 1935, p. 194) and was reiterated later in *SA* (1936, pp. 4, 17 & 189).

Sweeney (1935) indicated that the genesis of *SA* was 'the rather rudimentary stage in which it was left at the termination of the [*hyper*]inflation period in Europe' (p. 185). But he lamented that foreign writers did not appear to have given much thought to the 'unrealised gains and losses that result from changes in the value of money' (1935, fn. 12 & 1936, p. xii). This might be attributed to the lack of understanding by accountants of the monetary orientation of the stabilisation problem, *per se*. Yet, as noted above, by the early 1920s it was a well established theme in the economics literature.

Recently, Tweedie and Whittington (1984, pp. 32–33 & 262–263) claimed that Sweeney added little to influence the world-wide, ongoing debate on accounting for changing price levels. His contribution, they suggest, was limited to the introduction of ideas, pioneered in Germany and subsequently modified in France, to the Anglo-American accounting literature. In some places Sweeney's own words invite this view—'The . . . method . . . called "stabilized accounting", he explained, 'had its roots in methods . . . developed in Germany and France during the late inflation periods' (1936, p. xii). Yet in other places it could be inferred that Sweeney considered his exposition of stabilised accounting a *seminal* contribution (1964, pp. xxxviii, xliv & 38–39). Section 4 of this paper indicates that this is so, particularly with respect to his suggestion to consider simultaneously the impact and interconnections of homogeneous accounting measures with the concept of capital maintenance.

Whether Sweeney's work is entitled to the primacy so often attributed to it, or is essentially only a medium by which the techniques of stabilisation entered the English language accounting literature, has implications for the weight accorded his preference for replacement cost stabilisation (Clarke, 1982, pp. 327–335). With this in mind, Sweeney's writings are best examined in two stages—*pre* and *post* February 1928. For although Sweeney retained throughout his writings a 'homogeneous measuring unit principle', his *pre* February 1928 writings—the May 1927 first final draft of *SA* (see Sweeney, 1964, pp. xxi–xxii), the 1927 and 1928 *Journal of Accountancy* articles—and subsequent contributions conflict in detail, focus and emphasis.

Sweeney's two early articles contained a description of German stabilisation (or equalisation) proposals using historical costs as the primary source material. They entailed a *backwards* restatement of the data in terms of peacetime (August 1914) gold mark prices. This *Goldmarkbilanz* restatement format was depicted essentially as a balance sheet gold mark equalisation method. In contrast, his *post* 1928 writings are characterised by:

(1) Stabilisation procedures based on either historical or replacement costs; with a preference for a replacement cost based stabilisation (that is, a real replacement cost accounting) solution, involving *forwards* restatement procedures.[3]
(2) Elaboration and integration of the stabilisation principle as part of an economic based accounting theory. This is more readily evident in the *post* 1928 articles ['Maintenance of Capital' (1930), 'Capital' (1933), and 'Income' (1933)], than in the 1936 *SA* book.[4]
(3) Description of individual account stabilisation procedures to allow identification of the specific account adjustments giving rise to changes in profit.
(4) Construction of a stabilised profit and loss statement with an accompanying dissection of any gain/loss due to monetary fluctuation into realised and unrealised amounts.

## 2. Pre 1928 Sweeney

Sweeney (1927, *S27*) and Sweeney (1928, *S28*) drew heavily on the German experience for the illustrations of stabilised accounting. Specifically he drew on the German experience with *Goldmarkbilanz*, which according to Mahlberg (1923a, p. 187), was the 'most commonly used balance sheet stabilisation method by larger concerns in Germany during the hyperinflation'. *S27* outlined the effects of inflation on accounting whereas *S28* contained illustrations of *Goldmarkbilanz*. The mathematical impropriety of comparing, adding and subtracting units representing quanta of heterogeneous general purchasing power was discussed in both. Mahlberg's ideas were extensively relied upon by Sweeney *pre* 1928.

Sweeney's acknowledgement (*S28*, p. 108) and Tweedie and Whittington's (1984, p. 19) explanation that the example in *S28* (pp. 108–116) was 'adapted from Mahlberg's *Bilanztechnik und Bewertung bei schwankender Waehrung* (3rd ed. rev., 1923)', grossly understate the connection. Rather than an adaptation, the example is translated virtually verbatim from Mahlberg (1923, pp. 119–124). The only alteration in Sweeney's lengthy illustration is one item in respect of the capital account. Extracts of translations (see below) taken from Mahlberg's monographs (1920, 1923a & 1923b), Geldmacher (1920) and Schmalenbach (1921) indicate clearly that many of the issues discussed in *S27* had long been canvassed in the German literature. In the *S28* illustration of *Goldmarkbilanz* and in the majority of 1920–23 German proposals, historical costs were stabilised. Sweeney's *pre* 1928 explanations of stabilised accounting relied on a similar historical cost basis for restatement. Use of replacement costs attracted, and in fact warranted, little attention from him.[5]

The justification for Sweeney's examination of *Goldmarkbilanz* was its extensive use by larger concerns and his belief that it was 'probably among the simplest... probably the best of balance sheet equalization methods' (1928, p. 107). He viewed it as representing the 'most practical promise to accountants in the United States' (1928, p. 105). Why it was probably the best, and had the most practical promise are unstated. Two possible explanations are its simplicity and its retention of original cost (albeit stabilised). Another is that Sweeney was relying on some kind of rough extrapolation of the German business setting into the extant American business environment at the time. If so, it was completely unwarranted, for the German hyperinflation experience was unique. It was *incident specific*, as statistics produced in the 1930s by Bresciani-Turroni and more recently by Holtfrerich (1986), illustrating the effects of the commercial environment on prices before and during the hyperinflation, show.

### (i) *Explanation of Different Stages in Price Movements During the 1920–23 German Hyperinflation*

Consistent with propositions in monetary theory relating to the quantity theory of money, the intensity of *post* World War I inflation was not uniform. It is best considered as comprising two phases.

### (a) *Phase 1*

The first began in 1918 and culminated in a plateau of prices from April 1920 till May 1921. It forms the backdrop for the early *articles* on the price level problem by German *Betriebswirtschaftslehre* theorists. Mahlberg (1923a, p. ix) noted that short essays discussing the price level problem began to appear as early as 1919, mainly in engineering and industrial newspapers such as *Plutus* and *Industrie und Handelszeitung*. Authors included Schmalenbach (1919), Klein (1920), Geldmacher (1920), Mahlberg (1920), Prion (1920), Kast (1920) and many others (see Clarke and Dean 1986, pp. 83–84 for details). According to Mahlberg (1923a, p. ix) the most notable early contributor was Geldmacher (1920), who commented on *accounting problems* created by periods of large fluctuations in the value of money (*Geldentwertung*) following the war:

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[3] Sweeney (1936, pp. 38–39) delineates the differences between his *post* 1928 stabilised accounting involving a general index forwards scaling adjustment and the foreign method or *Goldmarkbilanz*.

[4] In the 1964 edition Sweeney describes *SA* as 'a practical elementary treatise in economics and accountancy' (p. xxiii).

[5] It is noted that in *S27* reference is made to Schmidt and his 'organic form of stabilisation' (p. 187). But it is only a passing reference, without any accompanying aura of approbation. Schmidt's (1924) survey of restatement methods had referred to 'Current Value Accounting in Goldmark on the basis of Current Paper Mark Values as at the Balance Sheet Date' (pp. 120–121), thereby indicating the presence in Europe of some advocates of an indexed stabilisation procedure based on the restatement of current or replacement costs.

> Annual profits are growing, as evidenced by many balance sheets! Mere tricks with figures!... Commercial profit accounting has gone wrong in this day and age... Especially since November 1919 many business people have been complaining almost ceaselessly that the money they are getting their hands on through the sale of their goods and products is often far less than what they have to invest, in immediately replacing the goods sold... [then, in the context of the 3,000 marks *reported* profits of a piano dealer, he decries] Had the dealer not sold his ten pianos, he would not have made *any* profit, but he would now own ten pianos of the same quality [and valued at 100,000 marks], instead of only one [valued at 10,000 marks]. (1920, p. 364, emphasis added)[6]

The circumstances spawned numerous books by, for example, Prion (1919 & 1921), Schmalenbach (1919 & 1921), Mahlberg (1921), Schmidt (1921), and many others (Clarke and Dean, 1986, pp. 87–88). The stabilisation proposals they presented were intended to incorporate the fluctuations in the value of money by either:

(1) utilisation of the normal or base stock method of inventory valuation—resulting in a profit figure based on the absolute maintenance of values (Schmalenbach, 1919), or
(2) indexed accounting adjustments (*Indexbuchfuehrung*), with forwards restatements of paper mark accounts (for example, Mahlberg, 1921 and Schmalenbach, 1921), or
(3) maintenance of relative values, valuing the cost of goods sold at their replacement costs as at the sales date to calculate income, and for balance sheet purposes valuing unsold items at their replacement costs as at the balance date. Schmidt (1921) was the main advocate.

The overriding focus of German business economists during this first phase is exposed by the titles of articles published at this time: 'False business cost estimation', 'The influence of changes in the purchasing power of money on cost estimation' and 'Proper and fictitious business profits' (Clarke and Dean, 1986, p. 83 provide details of these articles); and from the contents of Geldmacher (1920, see above). Mahlberg expressed it this way:

> Individual business is threatened insofar as it is forced by state price control to sell its products and output or services not on a profit mark-up based on replacement costs but on acquisition prime costs. (1920, p. 183)
>
> To determine profit the calculation formula should not read 'prime costs incurred plus profit' but 'replacement costs plus profit'.... The economic calculation formula, replacement costs plus profit, does not only apply for materials, salaries and expenses, but also for the inclusion of allowance for depreciation... (1923b, p. 3)

Although *data comparability* could be argued to have been the primary underlying objective of these writers, comparability was achieved by matching the current costs of resources consumed with current revenues, for costing, pricing and financial reporting purposes. In respect of financial reporting Schmidt's (1921) early views on the *price level problem* represented one of the earliest comprehensive forms of current value accounting[7]—acknowledged in the Anglo-American literature by, *inter alia*, Clarke (1976a), Mattessich (1982), Tweedie and Whittington (1984) and Graves (1985). In this work an appreciation of the intertwined business problems created by changing money values and changing relative prices is evident.

Although a current cost (physical capital replacement) perspective is the dominant concern during this phase, concern with reporting the effect of inflation, thereby reflecting a *data homogeneity* (real capital) perspective, also surfaces. Mahlberg's first essay (1920), 'Economic Relativities', consisted of two main parts—the first concerned the impact of inflation on the German economy of 1920, in order to compare it with its 1914 counterpart. In the second the impact of inflation on businesses was examined:

> When we look in the balance sheets of public companies for instance, at the fixed asset values of land and buildings and plant, they represent

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[6] This and all subsequent translations are the authors'. We are indebted to Walter Thanner, Thomas Junge and Warwick Rodden.

[7] Initially published in 1921 as *Die örganische Bilanz in Rahmen der Wirtschaft*, it was extended and republished under the same title in 1922 and then a substantially enlarged version appeared in 1929 under the title, *Die örganische Tageswertbilanz*. For details of the specifics of his work see Clarke and Dean, 1986, especially Schwantag's 1951 translated biography, provided as Appendix B to that article.

> on average, assets acquired in peace time and expressed in peace time prices. They surely therefore represent gold mark, resulting in an enormous undisclosed reserve according to today's prices. The shareholder is the owner of these physical goods, the bondholder a mere creditor, only an owner of assets in marks, the *value of which has melted away with inflation* (1920, p. 182, emphasis added).

Even in this 1920 article arithmetical homogeneity may be inferred as one of his concerns. In the same article the section on private enterprise was the forerunner of his major 1921 publication in which he suggested a modified variety of *forwards* adjusting stabilisation (see sub-section 2ii below).

Publication of Mahlberg (1921) coincided with Prion's *Financing and Balance Sheet Reporting of Economic Operations under the Influence of Currency Depreciation*, certainly one of the earliest German books on the impact of inflation on business finance and accounting. Prion's (1921, p. 11) merchant example illustrates his concern of matching current costs and revenues: 'The more I earn as a businessman, the poorer I become and the more I take in, the less able I am to pay my debts.' It reinforced the point made by Geldmacher (1920) regarding the piano dealer (see extract above) and was transported into the Anglo-American literature by Sweeney (1927, p. 184) via Mahlberg (1923a, p. 6).

Clearly the substantial price rises during phase 1 led to the recognition of the importance of replacement cost data, and their disclosure, by business economists. The focus was managerial—specifically focusing on data for costing, pricing and reporting purposes. The need for data homogeneity, although recognised by some, would become the major focus only after the crisis caused by the hyperinflation which rendered unstabilised historical cost papermark information useless for commercial purposes.

### (b) *Phase 2*

The May 1921 London Ultimatum on Germany's final War Reparation obligations disrupted the price plateau. Unexpected demand for increased repayments in the Ultimatum sent the financial markets into panic. Undoubtedly it acted as the catalyst of the rapid increase in the rate of inflation during the latter part of 1921 (Bresciani-Turroni, 1937, Table 5, p. 33) and was, in fact, the seed of the eventual hyperinflation, which many historians claim began in June 1922 (for example, Feldman, 1982; Kindelberger, 1984; Holtfrerich, 1986). Hyperinflation fuelled the second surge of academic accounting interest in the impact of the price level problem on accounting and business. It caused a change in focus in the ensuing stabilisation proposals.

Sweeney's stabilisation proposals were drawn from an array of *Betriebswirtschaftslehre* restatement mechanisms having their origins during phase 2. Predominant, particularly during the hyperinflation period, was *Goldmarkbilanz* as *the* accounting solution to price level distortions. Again, Schmidt's (1922 & 1923) organic current value form of stabilisation was the main exception. But exception was to be expected. For, economic historians have shown, the price level problem and accounting policy choice were very much *public*, rather than private or purely business, issues. In the main this seems to have been overlooked in the accounting literature, with the result that explanation for accounting methods has been sought only in accountants' writings.

Possibly relying on the ideas of Mahlberg (1923a and 1923b) that forwards adjusting was inappropriate when the currency's purchasing power became too volatile, Sweeney did not regard the switch from forwards adjusting *Indexbuchfuehrung* to backwards adjusting *Goldmarkbilanz* as surprising (1928, p. 108 & 1935, p. 186). Tweedie and Whittington (1984, p. 19) seem to have accepted this thesis. But, the economic and social history of the period strongly implies that the switch was as much the product of political compromise, as the product of a cold, clinical assessment of the business circumstances. The odds are that it was not a well thought out accounting solution, selected from the *many* forwards and backwards restatement proposals being offered by business economists at the time (see Mahlberg, 1923a, pp. 206–246 and Schmidt, 1924, pp. 81–120 for an annotated listing and illustration of the major proposals). The maelstrom of debate and the variety of adjustment mechanisms at that time are indicative of the general state of disorder from which the German *Goldmarkbilanz* solution emerged. The respective works of Schmalenbach and Mahlberg are examined as they played an important role in the socio-economic process of exposing an acceptable, pragmatic business, accounting and societal solution.

### (ii) *Schmalenbach and Mahlberg*

Clearly the majority of Mahlberg's early work (*pre* 1921) was consistent with the *paramount* concern of *Betriebswirtschaftslehre* theorists during 1920 and the early part of 1921—determination of the most appropriate cost calculation for business decision making and its consequential effect on profit determination. Even in some of his later writings there is further evidence in support of this proposition. For example, in the Introduction to a 1923 monograph he explains:

> The unstable value of money means an unstable disturbance to all those calculations where

> *amounts in marks from previous periods* are connected with each other, e.g. cost calculation, statements of revenue and expenditure, profit and loss accounting, . . . (1923b, p. 32, emphasis added)

As early as 1908 Schmalenbach had suggested that *pricing* policy should be based on a replacement cost rather than a historical cost formula. If this managerial policy were extended to profit determination and financial reporting Schmalenbach could be viewed as a replacement cost advocate. However, Schmalenbach is regarded by German accounting historians as the 'father of Indexbuchfuehrung' (see for example, Seicht, 1970, p. 413). His 1921 article on indexed accounting (which followed the aforementioned 1919 and 1920 *Betriebswirtschaftslehre* proposals) is regarded in the German literature as seminal, since it changed the focus of the inflation accounting debate. But only recently has it been accorded its deserved recognition in the Anglo-American accounting literature. In his commentary, Graves (1985, p. 121), although discussing Schmalenbach's 1921 article, claims that 'Mahlberg evidently enjoys the distinction of having presented the first *comprehensive* model for accounting for inflation in the accounting literature', in particular for the model in the first edition of *Bilanztechnik und Bewertung bei schwankender Waehrung*. But, Mahlberg was adamant that Schmalenbach's October 1921 article was more complete than either of his own 1920 or 1921 suggestions. In the Foreword to the 1922 second edition of *Bilanztechnik* Mahlberg explains that Schmalenbach 'inspired this second revised edition. . . . He recognised the *account* distortions arising from balance sheet corrections due to money value changes . . .' (1923a, p. viii, emphasis added).

Mahlberg's initial (1921) stabilisation proposal was partial and exploratory, since it involved restatement of data relating only to real, physical items (*Realwerte*), such as Plant, Buildings and Merchandise, from the opening balance sheet. However, monetary items (*Geldwerte*) and Capital were not restated. The restatement procedure was based on movements in the price of gold (*Goldagio*), whilst the closing balance sheet was established using capitalised or programmed values (*etatsmaessiger Wert*).[8] Mahlberg thus regarded any resulting increase in papermark wealth as profit.

In contrast Schmalenbach's 1921 stabilisation method entailed restatement of the historical cost values of both real and monetary items. Although there is no preferred measuring unit advocated in his 1921 article, he does discuss numerous possibilities, including: retail or wholesale price indices, foreign currency exchange rates, the price of gold and numerous other indices. His forwards indexing procedure produced the same profit result as the *Goldmarkbilanz* solution, subsequently used by larger concerns during the 1922–1923 hyperinflation, and ultimately recommended by both Mahlberg and Schmalenbach in 1922 following the deliberations of the German private industry sponsored *Indexcommission*. Sweeney's (1936) balance sheet adjustments were based on the data homogeneity principle underpinning Schmalenbach's 1921 method. Differences related to the types of adjustments in both the balance sheet and profit and loss statement and Sweeney's preference for a replacement cost stabilised system (see sections 3 and 4 of this paper for details). Under Schmalenbach's 1921 method:

1. The opening balance sheet acquisition values (both real and monetary items) were restated to their equivalent ending papermark value.
2. Any difference between the adjusted opening and closing capital amounts was regarded as profit.
3. Significantly Schmalenbach regarded part of the value (wealth) change between the opening and closing balance sheets as a business profit, whereas Mahlberg saw it as only a *value adjustment* entry resulting from the *value fluctuation in capital*. Profit variations arising from Mahlberg's and Schmalenbach's methods essentially were due to their different treatment of monetary items.
4. Gains and losses on the opening balances of monetary items (cash, debtors and creditors) were included in the profit and loss account.[9]

Although obviously concerned with the accounting distortions arising from the gyrations in *post* World War I prices, Schmalenbach appears to have been wedded to historical cost valuation for accounting purposes in times when price movements were perceived as normal. Recognition of the necessity for indexing historical costs is first evident in his 1919 monograph, and again in the seminal 1921 article, where forwards indexation is proposed as the means of achieving homogeneous data in accounts. But by 1922 Schmalenbach had changed tack and was advocating stabilisation on a deflated gold mark basis.

Graves (1985, pp. 61–64) suggests that the progression of Schmalenbach's ideas on indexation mirrored the degree of inflation experienced from

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[8] Graves (1985, pp. 141–155) and (1989) detail Mahlberg's valuation theory.

[9] Graves (1987) identifies the similarities and differences in Mahlberg's and Schmalenbach's methods.

1919 to 1922, a view with which we concur. He also described Schmalenbach's inflation accounting theory as an extension of his 'dynamic balance sheet theory dating back to 1908 (1985, p. 24) . . . the model is based on price level adjustments and seems to be put forward as a temporary measure . . . [the object of which was] a concern with achieving comparable periodic income figures (1985, p. 58) . . . requir[ing] an all encompassing stabilisation . . . [Schmalenbach chose] indexation for the measuring unit'.[10] The suggestion that Schmalenbach's aim was *income comparability* accords with our analysis of the concerns of the *pre* 1922 *Betriebswirtschaftslehre* movement. But it differs from our posited *data homogeneity* rationale of *post* 1922 *Betriebswirtschaftslehre* theorists. And it was the latter, of course, that formed the stated basis of Sweeney's work both *pre* and *post* 1928.

Tweedie and Whittington (1984) point to an apparent similarity in the approaches of Mahlberg (1921) and Schmalenbach (1921):

> Mahlberg was a pupil of Schmalenbach and both *preferred the stabilisation of historical costs* as a method of dealing with inflation rather than the alternative of replacement cost, although Mahlberg preferred the gold-Mark as the constant unit of measurement, whereas Schmalenbach preferred a unit based upon a general price index, such as was later used in the CPP proposals of the early 1970s. (p. 19, emphasis added)

But it is to be noted that Schmalenbach's preferred historical cost stabilisation method was apparently second best for Mahlberg. In contrast with Schmalenbach, even after the hyperinflation, Mahlberg continued to advocate an alternative to historical cost valuation. It was not an indexation solution, but rather one based on programmed values (1925 & 1927; and footnote 8 of this article). This suggests a fundamental difference in their approaches and ordering of their preferences to *changing prices* and the *price level* problem. These differences are significant for assessing the relative influence of these authors on subsequent events.

Ranking the relative importance of Schmalenbach and Mahlberg's contributions is more than a matter of cleaning up the detail. It sources the pressure for the adoption of particular procedures, thereby allowing a more informed evaluation of their appropriateness for today's environment. Contrary to the common view it is most likely that Mahlberg's *Goldmarkbilanz* proposal and Schmalenbach's 1921 pioneering data homogeneity concept were major influences on Sweeney's *pre* and *post* 1928 works respectively.

Schmalenbach's status in the inflation accounting debate is apparent from his appointment in November 1921 to chair the *Indexcommission*. This was a critical event, a point of departure in the hyperinflation accounting saga. Prices had begun to accelerate and the hyperinflation was near. According to Schmalenbach (1922, pp. 1–3) the *Indexcommission* was called within the private sector after hearings on the matter by the Reich Economic Advisory Council had come to a standstill in late 1920 and it was directed to explore the following issues arising from the hyperinflation:

1. Which of the known index numbers series was most suited for balance sheet purposes?—reporters were Ernst Kahn and Professor Fritz Schmidt.
2. Which of the suggested methods of computation was to be selected for balance sheet conversion?—reporter was Professor Walter Mahlberg.
3. What were the practical consequences of changes for accounting law and revenue law?—reporter was the lawyer, Richard Fischer.

Mahlberg (1923a, foreword to second edition) notes that the 'work of the Commission resulted in the recommendation that accounting be based on a fixed monetary value (in short, gold mark accounting)'. Notwithstanding Schmalenbach's status, his pupil Mahlberg was undoubtedly influential in the adoption of this gold mark stabilisation method. Graves (1985, p. 121), citing Schmalenbach (1922, pp. 2–3 and 1925, p. 210), claimed that the committee of the *Indexcommission* recommended the gold mark method on the basis of Mahlberg's speech at their conference held in late 1921. Thus, whereas Schmalenbach has been described correctly as the 'father of *Indexbuchfuehrung*', specifically forwards adjustments, Mahlberg is placed properly as the 'developer of *Goldmarkbilanz*' (Schmidt, 1924, pp. 94–95; Schoenfeld, 1979, p. 60 and Graves, 1985, p. 212), the picture remains incomplete without the background relationship between the two, and knowledge of their roles in developing a practical accounting stabilisation method in response to the hyperinflation crisis.

### (iii) *Lessons From the Hyperinflation and Goldmarkbilanz Proposals*

*Goldmarkbilanz* proposals, appearing when hyperinflation was at its zenith in 1922 and 1923, signalled a switch in emphasis by *Betriebswirtschaftslehre* theorists—from accurate profit measurement to asset and equity data homogeneity. Matching current costs with current revenues had been supplanted by the focus on balance sheet comparability.[11] Mahlberg (1923b) hammered home the new emphasis:

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[10] Schoenfeld (1979, p. 60) agrees that Schmalenbach saw stabilisation as a temporary measure.

> The obvious precondition of the *arithmetical idea* underlying the *balance sheet* is . . . that a uniform value of money must be used as a standard for the *measurement of balance sheet figures.* (p. 32, emphasis added)

Both Mahlberg (1922), and later Schmalenbach (1922), were of the many who, at one time or another, embraced *Goldmarkbilanz* (see above). The Committee of the *Indexcommission* 'elicited to endorse Mahlberg's method of restating accounting values in terms of their pre-war [August 1914] gold-mark value albeit by the more practicable means of indexation' (Graves, 1987, p. 48).

The main advantage claimed for it was that adjustments could be made continuously—thereby facilitating immediate intertemporal comparison. The method produced a profit figure representing the same amount of general purchasing power, as in Schmalenbach's 1921 indexation proposal involving forward adjustments. A plausible explanation for the *Indexcommission*'s pragmatism is that it was politically expedient. This economic consequence explanation is now explored further.

It is reasonable to infer that, at least in Germany, some officially prescribed form of stabilised accounting was inevitable from as early as 1922 following the *Indexcommission's* advocacy of *Goldmarkbilanz*. Although not required by legislation immediately, interest in stabilisation procedures in business, political and academic quarters was evident in the latter part of 1921 and the beginning of 1922, intensifying after June 1922 with the onset of the hyperinflation. Holtfrerich (1985, p. 125) is instructive:

> [Prior to August 1923] wage conventions were negotiated on the average about every two months in 1921, every month during most of 1922, biweekly at the beginning of 1923 and weekly as the hyperinflation spiralled. . . . About then the decision was taken in principle to stabilise the mark because as a government publication declared in 1924—with indexed wages no one was left to carry the burden of inflation. . . . A sliding price scale for industrial goods had been generally adopted by the end of 1921 to avoid the consequences of the currency's depreciation between the time of sale and time of payment.

It was not uncommon for other commercial documents, such as bond agreements, to have valorisation clauses and by November 1923 large quantities of value maintaining currencies (*Notgelde*) were in circulation. Also indicative of this intensification was the number of accounting books published in 1922/23 having *Goldmarkbilanz* in their title (Clarke and Dean, 1986, p. 88).

Although it was mainly the larger concerns that adopted *Goldmarkbilanz* (Mahlberg, 1923a, p. 189), it appears that the more modest commercial undertakings had accommodated the 'ills of hyperinflation' in various ways without formally changing their system of record keeping (Feldman, 1982, Kindelberger, 1984 and Holtfrerich, 1986, p. 304). For example, debts were often settled in more stable currencies, such as the US dollar. Several economic historians claim 'de facto stabilisation existed' prior to the end of 1923, preceding the 'de jure stabilisation' embodied in the 15 November 1923 Monetary Reform (Holtfrerich, 1985, p. 125).

Political and commercial discussions on the best method of currency stabilisation during 1921–23 were lengthy and controversial. Beusch (1928) categorised the various 'stabilisation' proposals into three groups, with (ii) and (iii) involving the introduction of a new currency alongside the old (*Papiermark*):

- (i) Index-linked taxation adjustments which accepted *Papiermark* as the official currency.
- (ii) Plans by industry and by politicians such as Schacht, Hilferding, Hirsch and Bernard for a return to the gold currency to provide an internationally acceptable means of payment.
- (iii) Plans to stabilise on the basis of a currency secured against the mortgage of land or commodities (specifics of (i)–(iii) appear in Holtfrerich, 1986, pp. 314–315).

The eventual compromise *Rentenmark* stabilisation proposal (a special form of *Goldmarkbilanz*) was part of a package of government measures—the November 1923 Monetary Reform. Unequivocally it was a political compromise, aimed at saving the Reich. Accordingly, the accounting and taxation stabilisation proposals embodied in this reform package could have been arrived at independently of any *Betriebswirtschaftslehre* arguments pertaining to the theoretical superiority of *Goldmarkbilanz*. The 'simplicity' argument posited by Mahlberg (1923a) and accepted by Sweeney (1928, p. 106) or the 'volatility' argument suggested by Sweeney (1928, p. 108), are just two of the possible political reasons leading to the Indexcommission's selection of *Goldmarkbilanz* in early 1922, and ultimately the *Rentenmark*, enacted in November 1923.

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[11] Again Schmidt is the exception. *Die örganische Bilanz in Rahmen der Wirtschaft* first appeared in 1921 and was revised in 1922. Notwithstanding the massive increase in the inflation rate during 1921 and 1922 the latter edition retained the suggestion for including *current* costs in accounts. There was no suggestion of incorporating a general price-level adjustment of the type proposed by Mahlberg and Schmalenbach. This is not to suggest that Schmidt did not recognise the importance of inflation; necessitating the physical matching of monetary assets and liabilities to negate the impact of general price level changes on a business. Clarke and Dean, 1986, pp. 76–77 describe Schmidt's managerial policy as 'his principle of identity of values'.

Most importantly, it is likely that the quest for financial or accounting purity was a matter of little influence in the ultimate decision—possibly even the most remote of factors. Political expediency was the foremost. Holtfrerich, for example, is adamant that the monetary reform measures (including the *Rentenmark* as the unit of account for business and tax purposes)[12] were the result of powerful political forces; the result of compromise. Holtfrerich viewed their implementation as a necessity for the survival of the German political system:

> [The inflation tax] burden on them [chiefly wage and salary earners paid in papermarks] weighed ever more oppressively, but by the same token its 'yield' to the state diminished. Revolutionary potential built up that threatened domestic public order and the integrity of the Reich. Currency [and with it accounting] stabilisation thus became *a necessity of the political system*, if the Reich were to survive; to a far lesser degree was it a necessity for the continued functioning of the economic system. (Holtfrerich, 1986, p. 334, emphasis added)

The mechanics of the *Rentenmark* stabilisation proposal exemplify this compromise:

> The government scheme (introduced by Luther with the aid of Hilferding) borrows from Helferrich's *Roggenmark* (rye currency) and from Hilferding's *Erfassung der Sachwerte* (registration of tangible assets) . . . (Mahlberg, 1923a, p. vi),

and

> [The reworking of Helferrich's plan eliminated] the dependence of the new currency on the value of the rye, and [brought] it into a fixed relationship with gold instead. [Luther and Hilferding] chose to make the gold value of the new currency identical to that of the pre-war mark. Further modifications imposed a credit ceiling of 1.2 billion marks on the new bank's dealings with the private sector—not least in order not to make the Reichsbank wholly redundant—and reduced the ceiling on credit to the Reich to 1.2 billion marks likewise. The 'Currency Bank' became the 'Rentenbank' and the 'rye mark' became the 'rentenmark'. (Holtfrerich, 1986, p. 316)

Historians note that the adoption of the *Rentenmark* proved an immediate and outstanding success. Identification of *why* has proven more difficult. Guttmann and Meehan (1975, p. 222) suggest that:

> The public's confidence was created by the conviction that the Rentenmark was backed by land and industrial property, and this in the public's mind was accepted as a *Sachwert*, as stable value.

In contrast Beusch (1928, p. 62) claimed the success was due to:

> [T]he return to the accounting basis of the peacetime [i.e. pre-war] gold currency. Since the new currency was identical with the former national gold currency as a unit of account, . . . the German people felt itself liberated from the oppressive burden of astronomical figures and . . . found its way back to reckoning in the old unit of account. The 'miracle of the rentenmark' lay in appreciating the psychological importance of enabling this return to take place. With a 'rye mark' this magic property would have been missed. (Cited from Holtfrerich, 1986, p. 317)

Even so, it is questionable whether Beusch refers there to accounting in the technical sense—that practised by accountants—as much as to 'a counting', the mechanism of calculating as applied in financial matters, for the confidence was a public rather than a professional phenomenon.

### (iv) *Summarising German Betriebswirtschaftslehre Developments and Sweeney pre 1928*

Prior to 1928 *Betriebswirtschaftslehre* theorists had shifted their focus from income comparability (see phase 1 above) to data homogeneity (phase 2). Unquestionably, Sweeney plugged into the latter line of thought, specifically as *Goldmarkbilanz* reflected it. Sweeney's recourse in *S27* and *S28* to *Goldmarkbilanz* is explicable, especially so given its dominance from 1922–25 in Europe generally (Hans, 1925 & 1926) and Germany in particular. However, by the time *S27* and *S28* appeared the unique events necessitating some form of *Goldmarkbilanz* had disappeared. This seems to be a possible reason why Sweeney elected to work further on his stabilised accounting manuscript, a draft of which had been completed in May 1927 (Sweeney, 1964, p. xxi). Thus ensued a period of 30 months of reflection on the dual problems of accounting for changing prices and changing price levels. Attention is directed now to the product of those reflections, his *post* 1928 works.

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[12] As Sweeney (1928, p. 106) noted, 'paper marks could not be eliminated from the bookkeeping system altogether in most cases because, first, being still legal tender, they could not be refused when offered in payment of debts, and because, second, each business was required by law to prepare a balance sheet at least once annually and to express it in terms of the imperial mark (the "paper mark")'.

## 3. Sweeney post 1928

Sweeney's *post* 1928 work has been subjected to considerable analysis producing differing interpretations. Clarke (1976a) was one of the earliest to categorise Sweeney correctly as (what is now labelled) a *real CCA* advocate. Whittington (1980), Mattessich (1982 & 1984),[13] Tweedie & Whittington (1984) and, *inter alia*, Graves (1985) have drawn a similar inference. For example, Tweedie & Whittington (1984, p. 33) note:

> unlike ARS6, Sweeney advocated that replacement cost rather than historical cost should, *ideally*, be the valuation basis to which CPP adjustment is applied. He was thus a pioneer not only of CPP (in the Anglo-American accounting literature), but also of real terms accounting (emphasis added).

Two apparent anomalies emerge from a closer look at Sweeney (see Clarke, 1976a): first, his emphasis on the problem of adding heterogeneous money units is not matched by his ambivalence regarding the contemporaneity in the stabilised data; and second, whereas the European *Goldmarkbilanz* prescriptions were mandatory, Sweeney presented *two* alternative techniques of stabilised accounting—'original cost stabilisation' and 'replacement cost stabilisation'.

The work done by Graves (1985, 1987 & 1989) and translations of the primary source materials of the period, permit possible clarification of these anomalies.

(i) *Goldmarkbilanz Versus Forward Restatement Procedures*

In Section 2 it was implied that the *pre* 1922 concern of the German business economists was to determine the effects of inflation on internal cost estimation, income determination and the efficient management of the firm. It has been suggested that the duality of the problem resulted in some of the proposals of that period failing to distinguish clearly between general price changes and relative price changes (Zeff, 1976, pp. 23–24). Sweeney's earlier (*pre* 1928) works were substantially based on Mahlberg, specifically on his 1922 gold mark deflation model, which was the product of political compromise following the hyperinflation. Since Sweeney's initial articles were the product of preliminary research into the various German proposals, his failure to recognise fully the ramifications of the compromise is understandable. He had not pursued the social, economic and political dimensions of the German proposals. Possibly he was engrossed in mastering the techniques of stabilised accounting, to the exclusion of the other, behavioural, dimensions of the hyperinflation. As the political crisis created by the hyperinflation had passed so had any need for *Goldmarkbilanz*. This interpretation explains why Sweeney in his more detailed and logically developed 1935 & 1936 versions of *SA* comprising *primarily*[14] forward adjustment procedures, departed from the *Goldmarkbilanz* method evident in *S27* and *S28*. These referred to *Goldmarkbilanz* as the method which 'probably promised the largest net benefit of all the corrective procedures...' (1928, p. 107). The *benefit* was perceived to exist, notwithstanding the lack of contemporaneity in the resulting stabilised accounting figures (Clarke, 1976a, pp. 265–267 pursues this point).

(ii) *Sweeney's Preference for Replacement Cost Stabilisation*

We agree with Graves' (1989) assessment that Mahlberg undoubtedly influenced Sweeney, particularly *pre* 1928. But the evidence suggests that Mahlberg was not the dominant influence. Our contention is that Schmidt had an equal if not greater impact on *post* 1928 Sweeney, particularly on his *emerging* preference for replacement cost stabilisation. He thus had plugged into the mainstream of the *Betriebswirtschaftslehre* movement through the work of its acknowledged foremost exponent. This conjecture mitigates Tweedie and Whittington's concern that Sweeney's 'preference for replacement cost over other values is not fully explained' (1984, p. 34).

Clarke (1976a, pp. 268–269) provides evidence that Sweeney *post* 1928 preferred stabilisation on the basis of replacement or reproductive cost. After citing support from Sweeney's 1933, 1934 and 1935 articles, he then turns to Sweeney's 1936 book and illustrates the point with several extracts. Evidence of Sweeney's recourse to Schmidt is unequivocal. It increased after Schmidt delivered his paper at the 1929 International Accounting Congress and the subsequent communications between Schmidt and Sweeney. It is possible that the two could have met in the USA at, or around the time of, the September 1929 International Accounting Congress where Schmidt delivered his paper on *Valuation*. Sweeney (1935, footnote 15, p. 199) invites this inference as he refers to 'a personal discussion of the subject [stabilised accounting]' with Schmidt on September 30, 1929. Whether, and if so where, Schmidt and Sweeney met is debatable. However, there certainly is evidence that Schmidt and Sweeney corresponded (Sweeney, 1931, pp. 176–177 & 1936, pp. 40–42). In several of Sweeney's works expounding stabilised accounting reference is made to Schmidt (Sweeney, 1927,

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[13] The seeds of these articles were contained in a paper presented at the Fourth International Congress of Accounting Historians (1980) in London.

[14] In the illustrations (pp. 105–168) in Sweeney (1936), both forward and backward restatements appear.

p. 188; 1930, pp. 280 & 284; 1931, pp. 166, 176–177; 1933, p. 190; 1935, p. 199 and 1936, pp. 40–42, 47 & 193). In the 1936 Preface to *SA* (p. xiv) Sweeney declared he became fully aware of Schmidt's ideas in 1929 through his criticisms of the fundamentals of stabilised accounting. Also in the text (p. 40) Schmidt is described as '*the* German authority on stabilized accounting' (emphasis added). It might be presumed from Clarke's investigations that any 'complete system' *necessarily* would involve restatements of replacement costs. Strong criticism from Schmidt of Sweeney's earlier (backwards, historical cost based) stabilised accounting proposals appear to have had an impact. They appear as a likely reason for Sweeney later presenting two alternative stabilisation techniques. Unquestionably, he preferred replacement cost stabilisation. However, a penchant for practicality[15] was drawing his sympathy for some form of the then accepted historical cost accounting—albeit stabilised.

Development of the final version of Sweeney's form of stabilised accounting appears primarily to have been the product of: (a) limited exposure, through recourse to Mahlberg (1923a), to the *Goldmarkbilanz* literature and the forces of political expediency which husbanded the historical cost stabilisation push, together with (b) Schmidt's criticism of Sweeney's stabilised historical cost capital concept (*pre* 1928) and Schmidt's promotion of the notion of real (physical) capital. By the early 1930s Sweeney's compromise solution had been formulated.

## 4. Sweeney and real capital—some reflections

Earlier in this paper (fn. 4) it was noted that Sweeney perceived his *Stabilized Accounting* as a 'treatise in economics and accountancy'. Sweeney's concern over the problems of valuation in accounting was the catalyst for forays into inflation accounting. He acknowledged this in the 1936 Preface:

> The whole valuation process, dictated by conservatism, expediency, and practicality, seemed a mere conglomerate hodge-podge, largely because of the continuing reliance on original (or, as it was often called, aboriginal) cost. In my quest for a solution I was impressed by present value (if it could be determined satisfactorily) because it always represented the current worth of the particular asset or business. (p. xviii)

This anxiety permeated his articles on 'Capital', 'Maintenance of Capital' and 'Income'. Sweeney was fully aware of the various capital concepts (1933 & 1936, pp. 47–53) and was equally adamant that stabilised accounting had the aim of preserving *real capital* consisting of the general purchasing power of the original investment. This notion drew heavily on Irving Fisher's work on stabilisation. However, Sweeney's concern with real capital does not sit comfortably with his preference for replacement cost stabilisation. For example, in addition to the material discussed above he suggested that 'If on the other hand, capital is, *more sensibly* regarded as *physical capital* (which incidentally is not the [sic] stabilized view), then appreciation is capital, and not income...' (1935, p. 197, n. 14, emphasis added). And then later (1936, p. 48): 'Physical capital is undeniably a safer type of capital to preserve than mere nominal capital'. This inconsistency and the compromise product of his concerns, we believe are indicative that the notion, which has since been labelled 'Real CCA' or 'Real Terms Accounting' (Tweedie & Whittington, 1984, pp. 8–9 and Mattessich, 1982, p. 354), was ill conceived. For, notwithstanding Fisher's stabilisation forays, 'real' has been used in the economics literature in many instances to describe the actual change in general purchasing power, in contrast with the change in nominal monetary terms. That Sweeney's application of general price index numbers to data indicative of original cost and then replacement or reproduction costs is incapable of yielding any such measure has been previously discussed in detail by Clarke (1976b).

Like those who have followed him in such an exercise, the technical propriety (again, Clarke, 1976b, pursued this aspect) of Sweeney's calculations (and the inferences drawn from them) stumbled at that point. In *SA* it is to be recalled that Sweeney estimated reproduction costs with specific index numbers (1936, pp. 49–53), data indicating amounts of money *required* to reproduce the physical assets in question, not the amounts of cash actually possessed and thereby actual general purchasing power commanded by the firms. Yet Sweeney proceeded to treat the estimated reproductive costs as if they were indicative of the general purchasing power money equivalents of the physical assets. From chapter II onwards in *SA* general indexed historical costs or indexed estimated reproductive costs carried forward from period to period are compared to yield so-called 'specific purchasing power gains and losses'.

We posit that such calculations and comparisons cannot yield data indicative of purchasing power gains or losses. The reproductive estimates were not estimates of any kind of purchasing power possessed by the firms. Neither were those aggregates indexed by either general index or by specific index numbers. It is a well held view that *general* purchasing power is a unique characteristic of actual money (e.g. Chambers, 1966, pp. 70–72). And, by definition, general purchasing power embodies the power to purchase specific items. Only price data truly indicative of the actual amount of money embodied by a physical asset, indicative that is of the amount of money it can be used to purchase, signal such power. Estimates of reproductive costs are not directed at such information. Rather, they are intended to be indicative of how much money the firm will need, will 'thereby not have', if the choice to reproduce or replace is made. Clarke (1976b) argued that 'Real CCA' is a technical impossibility as long as replacement or reproductive cost data are employed. Sweeney appears to have accepted, as many proponents of Real CCA today still do, that scaling replacement costs results in a meaningful product. Why was no reference made to the different monetary equivalents referred to in the illustrations: selling prices and replacement prices? Perhaps the subtle, but significant, difference between the financial import of selling prices of assets held and estimates of what it would cost to reproduce them, was not fully appreciated. Reproduction cost stabilisation applied to the accounts of 'Mill Agents' in Chapter IV of *SA* supports this inference. According to the text of *SA*, Mill Agents was a factoring company with book debts and securities valued at their selling prices scaled with general index numbers. As such, the data and the results produced were significantly different from those in the other illustrations. Mill Agent's monetary equivalent account balances were stabilised in 'real terms', whereas the others we argue were not.

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[15] Practicality undoubtedly influenced Sweeney (see 1936, pp. 43 & 193) and the comments made by Sweeney (1964, 'Forty Years'). Both Schmalenbach and Schmidt stressed practicality as a necessary element of any accounting reform proposal. Kester's desire, and the need to satisfy the PhD requirements to have a practical solution, presumably also influenced Sweeney (Sweeney, 1964).

## 5. Conclusion

*Post* World War I German *Betriebswirtschaftslehre* theorists undoubtedly influenced Sweeney. Their concern was with the problems created by changing prices and a flexible measuring unit. Noted were Seicht's observations that, even before the onset of hyperinflation, similar concerns had been expressed by other European academics, possibly drawing on the works of Fisher. Such concern initially resulted in German *Betriebswirtschaftslehre* theorists advocating solutions requiring a 'matching of current costs with current revenues'—described above as an income comparability focus.

Notwithstanding this initial concern, the *hyperinflation* acted as the catalyst for stabilisation restatement methods directed towards achieving data homogeneity: initially the forwards *Indexbuchfuehrung* adjustments of Mahlberg (1921) and Schmalenbach (1921), and then secondly the *Goldmarkbilanz* proposals of Mahlberg (1922) and Schmalenbach (1922), were all premised on an idea of homogeneous purchasing power being the measuring unit coupled with a balance sheet focus.

Sweeney's legacy is misunderstood by many. Graves (1987), and Tweedie and Whittington (1984) are, however, partial exceptions. The latter suggested:

> that few, if any, of Sweeney's proposals were original. Sweeney's unique contribution was to impose a coherent and consistent pattern upon them, to express the case for them with clarity, logical consistency and eloquence and to demonstrate through his meticulously worked case studies that his system was feasible. (1984, p. 33)

Analysis here also adds weight to their conclusion that Sweeney made stabilisation accounting procedures accessible in the English language. Whether, as Graves (1985) suggests, it also represented 'an extension' or a 'development' to the literature, is debatable. No doubt Sweeney's *post* 1928 writings synthesised the *post* WW1 German and French literature on inflation accounting. However, Sweeney's contribution is considerably more. At least in one area, there appears to be an extension: the coupling of the notion of a homogeneous (stable) unit of measure with a function of accounting which was 'to provide a *measure* of an entity's command over goods and services and any changes therein'. The conjunction resulted in the first real CCA proposal in the English language.

It is possible that the political and economic vicissitudes of the German environment on which he drew lured him, along with many others, into losing sight of the necessary connection to be maintained between actual money (or its equivalent) and every measurement of general purchasing power. His variety of real CCA was conceived in the spirit of inviolate principle, but developed within the maze of political compromise and economic practicability characterising European commerce during the post World War I hyperinflation and the early *Betriebswirtschaftslehre* movement.

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# Industrial Cost Accounting Developments in Britain to 1830: A Review Article

John Richard Edwards

**Abstract**—Haydn Jones's *Accounting, Costing and Cost Estimation* (1985) uses the surviving records of numerous Welsh companies, engaged principally in metal manufacture between 1700 and 1830, to demonstrate the use made by managers of accounting data, as the basis for planning, decision making and control. This article relates the results of Jones's research to existing views regarding the development of industrial cost accounting, particularly because his findings call into question 'single variable' explanations for the development of management accounting, such as the level of industrialisation, the relative impact of fixed and variable costs, and the organisational structure of business activity. Jones's findings also require a reappraisal of established ideas concerning the relative sophistication of financial and management accounting procedures in use in earlier times, and our perception of the contributions of accountants and their techniques to business developments.

## Scope of study

According to Parker, cost accounting 'in its original meaning [involves] the accumulation and assignment of historical costs to units of product and departments, primarily for the purpose of stock valuation and profit measurement. In its modern meaning, it is difficult to distinguish from management accounting' (1984, p. 47). This is, in turn, defined as 'that part of accounting which is concerned mainly with internal reporting to the manager of an enterprise. It emphasizes the control and decision making rather than the stewardship aspects of accounting' (1984, p. 115). We are not of course dealing with recent business developments, but it will become clear that a 'modern meaning' of cost accounting is a more relevant reference point for the content of this essay. For our purposes cost accounting is therefore defined as 'the accumulation of relevant costs to be used by managers for the purposes of planning, decision making and control'.

The term cost accounting may of course be used to describe procedures employed in any business sector, including organisations engaged in manufacturing, where the more specific title 'industrial cost accounting' is used in this paper. We also know that cost accounting procedures were used in other countries very early on, e.g. in Roman times (Macve, 1986, pp. 241–6), and some fairly advanced applications, even to manufacturing, have been found in the fifteenth and sixteenth century records of the Medici family (which was engaged in the manufacture of cloth in addition to its extensive banking activities) and in the account books (1563–7) of Christopher Plantin, a Flemish printer.[1] The more narrow focus of attention in this paper, however, is the development of industrial cost accounting in Britain prior to 1830, with attention concentrated mainly on the measurement of activities that are factory-based rather than those carried on in the home.

## Development of industrial cost accounting: some views

Over the years ideas have changed concerning what dates, and events, have seen significant developments in industrial cost accounting, and this process is likely to continue as more information becomes available. Solomons (1952) undertook the first thorough examination of the development of cost accounting,[2] and he identified the year 1875 as being of particular importance. From the early fourteenth century to 1875 major cost accounting developments dealt with the following technical matters: bringing records of industrial activity within the double entry framework of bookkeeping, and devising a means of tracking internal transfers of goods from one process to another. After 1875 the broader issue of making accounting records mean something, in terms of the provision of information for decision making, is given

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The author is Reader in Accounting within the Cardiff Business School and Director of its Business History Research Unit. He is grateful to Trevor Boyns, Derek Matthews and Malcolm Morgan and an anonymous reviewer for helpful comments on an earlier draft.

[1] Garner (1954), ch. 1, summarises the main features of these and a number of other early industrial cost accounting systems.

[2] Solomons did however draw heavily on earlier work by Edwards (1937a and 1937b) for much of the factual content, particularly English and French developments up to the late nineteenth century.

greater stress. Solomons refers to the 1880s and 1890s as seeing a 'costing renaissance' but, while there was undoubtedly a burgeoning of the literature after 1875, it does not necessarily follow that this reflected a corresponding upsurge of interest in costing procedures on the part of businessmen.

The notion that costing procedures developed on a significant scale only after 1875 seems inconsistent with the fairly persuasive demand/response theory of accounting development, which sees it as a social technology continually responding to changes in business requirements. Solomons' explanation for the lack of progress is that, in the absence of keen competition, prices could be set at a level which produced generous profit margins and, therefore, the need for detailed costing data was not strongly felt. In reaching this conclusion he pays rather too much attention to the engineering industry—competition was much keener elsewhere, e.g. in textiles and metal manufacture—and ignores the fact that nineteenth century trading conditions are notable for sharp fluctuations between boom and slump.

A more persuasive scenario is put forward by Garner (1954, p. 3) who argues that the initial impetus for the development of cost accounting was the replacement of the domestic system by capitalist processes of production. In his view the British industrial revolution (conventionally assigned to the period 1760–1830) merely accelerated the rate of change, and was not the main stimulus for change, as is claimed by accounting historians such as Littleton (1933) who described it as 'one of the many consequences of the industrial revolution' (p. 321). Nevertheless, Garner's statement that 'during the decades 1820–1880 little can be found which is of interest in the development of cost accounting, either in this country [the United States] or abroad' (1955, p. 9) is altogether too sweeping.

The conclusions reached in the literature, referred to above, suffered from the fact that, at the time of writing (1933–55), there was a severe shortage of published material available describing industrial cost accounting practices in use in earlier times.[3] Important contributions have since been made by, among others, Burley (1958), Rimmer (1960), Pollard (1963, 1965), McKendrick (1970), Johnson (1972), Stone (1973) and Jones (1985).

Surveying some of these findings—particularly Stone's and Johnson's discoveries that fully integrated cost and financial accounting systems were in operation, respectively, at the Charlton (cotton) Mills, Manchester, in 1810 and the Lyman Mills, Boston, Massachusetts, in 1854—Johnson (1984) has plausibly argued that it was the change in the organisational structure of business activity which provided the principal stimulus for the development of cost accounting. Prior to 1780 much of what might be broadly described as industrial activity was carried on within the domestic system and comprised a fairly simple series of market transactions. The businessmen purchased materials which were then 'put out' to a variety of artisans, each to perform a particular processing function paid for on the piece rate basis. The product, when finished, was sold. At each stage of manufacture, the businessman needed very little by way of accounting information to decide which course of action was preferable, e.g. further processing or sale, as most of the data was provided by readily available market prices. It is therefore within what Johnson describes as the 'single activity organisation', which flourished between 1780 and 1900, that the internalisation of activities (both employees and manufacturing processes) gave rise to the need for the development of cost and profit finding techniques as the basis for both performance assessment and resource allocation decisions.

## Industrialisation in Wales

Much of the attention devoted to the impact of industrialisation on accounting developments has focussed on the textile industry and, indeed, it has been said that there are grounds 'for believing that the origins of industrial cost accounting were in this industry' (Mepham, 1988a, p. 57). Prominence is given to the textile industry probably because important technological developments, in the early years of the industrial revolution, facilitated a dramatic conversion from the domestic system to much more efficient factory-based production; artisans performing a range of different tasks in their rural cottages were brought together, under one roof, to do their work in a more organised and closely supervised environment.

The seeds of industrial change were, however, sown much earlier, and the transition from the domestic system to the factory system resulted from a process of trial and error which started in the seventeenth century in an endeavour to develop a more efficient organisational structure (Beckett, 1977). The silk-throwing mill constructed by John Lombe near Derby, in 1717, is generally considered to be the first example of a factory in the *modern* sense of the word. It was 500 feet long, five or six stories high, resembling 'a huge barracks ... with its automatic tools, its continuous and unlimited production, and the narrowly specialised functions of its [300] operatives' (Mantoux, 1928, p. 199). Certain important features of the modern factory already existed, however, in what has been described as the 'proto-factory'. These were a significant investment in tools and implements, a labour force assembled within the 'factory' to enable close supervision, division of labour, and the development of production methods designed for 'flow production' (Mepham, 1983a, pp. 57–8). Each of these features was present in, for example, a number of Scottish linen 'manufactories' by the year 1700 (Marshall, 1980, ch. 6).

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[3] The work by Roll (1930) on Boulton and Watt has received little attention from accounting historians.

Certain developments in Wales also contributed to the process of industrialisation. At the beginning of the eighteenth century, Wales was still a rural economy, save for a scattering of metal mining throughout the Principality and an embryonic metal-smelting industry, particularly copper, in the Swansea region. The development of new smelting techniques, in both copper and iron, together with the extensive reserves of the South Wales coalfield, provided the potential for a rapid development of the metal-smelting industries in the eighteenth century. Progress occurred first in copper-smelting, which made great strides between 1700 and 1730; iron-making remained of relatively little significance until after 1750 when it began to develop, first slowly, but later at an enormous pace, along the northern outcrop of the South Wales coalfield. The century also saw the continued development of the metal mining industry; most notably that of (silver-) lead in the Flint/Denbighshire region of north Wales and, later, in the east Cardiganshire/west Montgomeryshire area of mid-Wales; also copper in the Parys Mountain, Anglesey, where an exceptionally rich deposit was discovered in the late 1760s. Other developments in north Wales included iron-smelting around Bersham, and slate quarrying and copper mining in Snowdonia.

### *Early Welsh Metal Works*

A major impetus for developments in Wales was the new and more efficient method of smelting copper ores, in a reverberatory furnace using coal as fuel, developed in Redwood (Gloucestershire) during the 1680s. At about the same time, the deepening of Cornish pits and the introduction of gunpowder, for blasting, allowed the extraction of large quantities of copper ore. These events facilitated the development of a copper-smelting industry and, on a smaller scale, a lead-smelting industry, around Swansea at the western end of the South Wales coalfied in the 1690s (John, 1980, p. 48).

The Swansea region benefited from important locational advantages—its proximity to the sea and the availability, in large quantities, of suitable coals required in the ratio of 3:1 with copper ore—and cheap local labour. Copper ore was brought in, initially mainly from Cornwall; later from Anglesey. By 1750 the Swansea region was clearly established as the centre of the non-ferrous metal-smelting industry in Britain. At that date approximately one half of all British copper was smelted at factories in Neath and Swansea; and this increased to about 90% by the end of the century.

The manufacture of non-ferrous metals, and iron, basically involved heating or smelting appropriate ores in the furnace in order to extract the metal content and remove impurities. The production process comprised a number of stages, although the exact method of manufacture varied from one metal to another. Copper production involved 'smelting', 'melting', 'roasting', and 'refining'.[4] In the case of iron-making, the unrefined pig iron, extracted from the blast furnace, went through additional processes of heating and hammering in the forge to remove impurities and produce more flexible bar iron.

The earliest Welsh applications of the reverberatory technique for smelting copper occurred at the Abbey works and the Melincryddan works, both located at Neath. The Melincryddan Lead and Copper Works, constructed 1695–8, has been described as the first modern factory constructed in Glamorgan (John, 1980, p. 17). It was built by Sir Humphrey Mackworth who arrived in Neath in 1686 and was a central figure in the development of the local metal industries. The Neath Abbey Works was in operation by 1710, owned by a partnership of businessmen headed by Dr. John Lane, who is thought to be one of the first graduates of the University of Oxford to become an industrialist (John, p. 22). In 1717 Lane built the Landore (sometimes called Llangyfelach or Languevelack) works consisting of twenty furnaces, a refiner's house, smith's forge, blast house, rod mill, test house, laboratory and, notably, an accounting house.[5] The factory 'shell' cost £2,000, and in the first year of operations output consisted of 80 tons of lead, 80 tons of copper and 1,300 ounces of silver. Lane, 'a man of limited means but large ideas' (John, 1980, p. 23), was bankrupted in 1724. The business was then run by Robert Morris, as receiver, until 1727 when it was taken over by Lockwood, Morris & Co.

Also of interest, as an example of an early copper works constructed to undertake a series of industrial processes, is the White Rock Copper Works built under a lease (1736) which obliged the partners to erect within three years 'one new copper smelting house . . . for smelting making and refining copper or any other metals and to contain 20 furnaces at least with such warehouses, mills and other buildings as . . . [the partners] . . . should judge necessary and convenient' (extract in Roberts, 1981, p. 141).

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[4] Further processing, more commonly carried out in the Bristol area than in Wales at this time, involved rolling, splitting and stamping (into shapes) the refined metal.

[5] The exact activities carried out in the accounting house are not stated by John. They may well have involved the measurement of the metal content of ores—a function often carried out in an assay house—as well as more mainstream accounting functions.

### *Capital and Labour*

Welsh metal manufacture therefore involved a series of industrial processes and the internalisation of labour within the factory at an early stage, but it must be recognised that these establishments were not heavy consumers of labour, although specialist skills were required to perform certain functions. It has been roughly estimated that 20 men were employed at the Melincryddan Copper Works (1730s), 40 at the Landore Lead and Copper Works (1720s) and 55 at the White Rock Copper Works (1750s). Indeed the total number employed in the south-west Glamorgan copper industry has been put at little more than 200 in the 1730s, growing to 500 in the 1770s, and 1,000 in 1800.[6]

Rates of pay, during the eighteenth century, seem to have varied dramatically from time to time and place to place, and also, naturally, depended on the level of skill involved. The broad range seems to have been 6 s-18 s per week. On the basis of costings reproduced by Jones, it seems unlikely that the wages bill often amounted to much more than 5% of total operating expenses.

The metal industry was highly capital intensive, of course, consisting of not only buildings, furnaces and utensils, but also heavy investments in materials, which turned over slowly, and in the long periods of credit allowed to customers. It has been estimated that the average investment per worker in 1800 was £500 (Roberts, 1980, p. 56). It was certainly not less in the eighteenth century judging from the accounts of the Landore works for 1745. The balance sheet of this organisation, employing approximately 40 workers, showed a fixed capital investment of £20,000 and a total balance on the partners' capital and current accounts of £34,859 (Jones, 1985, p. 34). Assuming an interest rate of 5% on capital invested, gives an interest charge which is probably of a broadly similar magnitude to the wage bill.

## Jones's contribution

Haydn Jones's *Accounting, Costing and Cost Estimation* (1985) uses the surviving records of numerous Welsh companies, engaged principally in metal manufacture between 1700 and 1830, to demonstrate the use made of accounting data by managers as the basis for planning, decision making and control. The later records explored by Jones include giants of the industrial revolution such as the Dowlais Iron Company, the Cyfarthfa Iron Works, and the Mona Mine Company.[7] According to Yamey, who contributed the Foreword to Jones's book, '[It] is, I believe, the first written by a scholar with a detailed knowledge of accounting that describes and analyses in detail the accounting records of a number of industrial enterprises, and also shows—as far as the materials allow—how information contained in the accounts was used for control purposes by owners and managers as well as in connection with the making of business decisions related to the deployment of resources... it is a pioneering exploration, in depth, of what has been a large tract of virtually unknown territory' (pp. viii–ix). More studies of the kind undertaken by Jones are needed to set the records straight, but his book already places us in a much better position to assess the relevance or otherwise of accounting as the basis for business decisions up to 1830.

The remainder of this article therefore attempts to relate Jones's findings to previous knowledge regarding the development of industrial cost accounting and to evaluate its significance for our perception of the contributions of accountants, and their techniques, to business development.[8]

## Industrial cost accounting practices 1700–1830

### *Stock Records*

The basic accounting procedures used by merchants to record purchases and sales of stocks were gradually applied to the more difficult problem of tracing internal movements of goods within an industrial enterprise. At the Tredegar Forge, 1710–11 (p. 12), weekly records were maintained of the quantities of iron made and sold, and the balance of stock remaining; similar records of quantities and weights of pigs smelted, shipped and balances remaining were prepared at the Cawdor Estate, Carmarthen in the 1790s (pp. 80–1). The importance of stock records as a means of keeping close track of goods is further emphasised by the allowances made for 'loss in melt' and breakage in the 1727 records of Lockwood, Morris & Co.'s newly acquired Landore Copper Works (p. 76).

The need to value, as well as quantify, stock issues arises when financial measures are required for the purpose of performance assessment. In the case of transactions in trading stock, the valuation of issues at selling price enabled the calculation of what is today termed gross profit. Examples of how this was done are contained in the records for the Tredegar and Machen Forges, 1748 (p. 152), in respect of receipts and issues of merchant iron, and at the Mona Mine Company, 1787–8 (p. 85), for purchases and sales of copper. Pollard[9] tells us (1965, p. 221) that, outside Wales, the Coalbrookdale Company from 1718 onwards 'credited the "Pigg Yard" both with sales of pigs outside and with transfer to the air furnaces for re-melting and casting'. It is not made clear, however, whether valuations were included and, if so, whether issues were shown at cost or selling price. Certainly Jones discovered no clear evidence of attempts being made to cost internal transfers prior to the remarkable Crawshay ledger of 1791–8 (see section entitled 'Integrated Cost and Financial Records').[10]

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[6] These are figures for employees located at the works and paid a weekly rate. Often there were numerous outworkers (e.g. agricultural labourers working part-time) collecting fuel and being paid on a piece rate basis.

[7] Jones also provides interesting details of early external reporting practices and auditing procedures (chapter 9). These are not considered in this paper.

[8] All subsequent page references are to Jones unless otherwise indicated.

We can therefore say that the careful recording of receipts, issues, and the balance of stocks, in quantity and value, was well established in certain Welsh companies by 1800, but that the costing of internal transfers was exceptional.

### *Cost Finding: Estimates and Actual*

The early development of iron-making in Wealden is examined by Straker (1931) who reproduces or derives a number of costings from business records covering the period 1330–1773. Some are extremely rudimentary, but of particular interest is an estimate of the cost of producing one ton of bar iron at Newbridge in Ashdown Forest furnaces and forge in 1539 (p. 195), and an annual cost estimate for the Heathfield Furnace for 1746 (p. 199). Another early example of cost finding is contained in a document issued by the London members of the Worshipful Company of Bakers, 1620 (Garner, 1954, pp. 31–3). This item, designed to demonstrate that the selling price of baked bread was too low, contains a careful build-up of the weekly cost of production, and refers to the need for an allowance for 'ill debtors'. Various aspects of the proprietor's personal expenditure are also included which, from a twentieth century perspective, might be regarded as a surrogate for his wages.

The records examined by Jones also display a keener interest in cost estimates than in the build-up of actual costs incurred undertaking a particular activity. This probably reflects the absence of detailed record-keeping, and the lack of any conviction that the benefit obtained from such information would justify the work involved in its preparation. A theoretical calculation of the total cost of making 300 tons of bar iron at the Pontypool Forges over a 12 month period is prepared by John Hanbury (1704), and the result is divided by 300 to give a cost per ton of £13.2s.0d. which is compared, favourably, with the estimated selling price of £15. Particularly notable, in this and other exercises described by Jones, is the careful thought devoted to the preparation of estimates; Hanbury recognises that some of the costs might appear to some people a little low, but he takes the view that this is compensated by the fact that some of the other costs are probably generous (pp. 13–14).

Daniel Peck, proprietor of the Lead industry in Flint, prepared a calculation (1707) which sets out: the actual direct cost of the weekly output distinguishing between smelting, refining, and conversion costs; the values of the products and by-products produced; and a comparison of the two totals to produce a balance which is called 'weekly profit'. This is multiplied by 46 to produce an annual figure from which are deducted certain overhead costs to produce a residual profit figure (pp. 15 & 18). The records of the Landore works, for the 1730s, contain a sophisticated assessment of 'The Charge of Making a Ton of Copper when the Ores produce one in ten', i.e. ten ton of copper ore yields one ton of refined copper. The calculation sets out the various direct costs—materials, labour and expense—for each stage of production in the following order: smelting, melting, roasting and refining. Carriage inwards is included and also allowances for candles, smithswork and repairs to furnaces at each stage of production. Added to the total direct costs of production are certain indirect costs such as salary of agent, rent of workhouses, and selling (commission) and distribution (freight from Neath to London) costs (pp. 22–3).

Burley's investigation of the accounting records of Thomas Griggs (1742–60), an Essex textile manufacturer, may be mentioned as an early known example of interest being shown in the identification of actual costs incurred. There were five main processes: wool sorting, cleaning, combing, spinning and weaving. The first three stages, which appear to have involved relatively little in the way of labour and capital requirements, were performed on the premises; the remaining work was undertaken by approximately five hundred outworkers and the surviving records focus on activities these individuals, presumably because records were not required to provide information about transactions under the owner's direct supervision. The records have been likened by Burley (1958, p. 54) to those maintained by the Medici family in Florence almost two hundred years earlier. But Grigg's records seem significantly less sophisticated; for example they are not on the double entry basis, they do not contain overheads, and the financial data is fairly patchy compared with the reasonably comprehensive costings contained in the Medici records. Of perhaps more interest are the forty or so *ad hoc* direct costing calculations made for various fabrics at a time (1749–59) when demand was low and direct costs were high. As in the case of Josiah Wedgewood's business (1772), poor results seem to have stimulated cost consciousness (McKendrick, 1970, p. 49).

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[9] Pollard's studies—which cover the period 1760–1830—comprise the only other extensive examination of industrial cost accounting records which overlaps significantly with the period covered by Jones.

[10] Richard Crawshay took over the Cyfarthfa Iron Works in 1786, and it remained in the family until the latter part of the nineteenth century.

One of the problems faced by early industrialists attempting to produce relevant financial data for decision making purposes (and also by present-day researchers trying to understand calculations made in the distant past) was the existence of customs and practices which obscure the actual costs incurred. The following calculation made by Thomas Beer, the accountant of the Mona Mine Company (1824), is illustrative of the kinds of adjustments which were necessary to sort out the wood from the trees. Beer was trying to help his employer decide whether to adopt a course of action which, on the face of it, appeared very unlikely to prove worthwhile, namely the payment of £126 for sufficient copper ore (12.5 tons) to produce a ton of copper when the market price of copper was £112 per ton.[11]

The calculation shows that the smelter *nominally* pays £126 to the mine owner, but that the *actual* amount paid over is net of the returning charge (the standard rate for smelting copper ore), set at 55s per ton at this time. To the net payment, £91.12.6. [£126 – (55s. × 12.5)], is added the actual cost of smelting, £21.17.6., to give a figure of £113.10.0. As it was the normal trade practice to supply sufficient copper ore to produce 21 cwt (20 cwt to the ton) of copper, an adjustment is made to reduce the cost by the sales value of 1 cwt of copper, i.e. £5.12.0 (£126 × .05). This results in a net cost of £107.18.0. (£126—£5.12.0). The rolling cost, £5, is then added to produce a final figure, which is recognised as not taking account of commission to the selling agent, interest on capital etc., of £112.18.0., to given an 'apparent loss' of just 18s. (p. 205).

### *Choosing Between Alternatives*

Parker tells us that, at the beginning of the twentieth century, engineers and cost accountants began to emphasise the need to look forward rather than back and, when doing this, to focus on differential costs as the basis for business decisions (1969, pp. 22–3). This was a much needed reaction against the excessive emphasis placed on past costs by engineers such as Alexander Church and Frederick Taylor. However, Jones shows us that the advocates of forward planning, referred to by Parker, were merely echoing the practices employed by businesses operating in Wales up to 200 years earlier.

An analysis undertaken by the Mine Adventurers of England (1710) contrasts the cost of smelting, refining and reducing ore at Neath compared with Garreg over a 12 month period (p. 222). Robert Morris (1728) produces figures to demonstrate, as erroneous, the established view that it was cheaper, and therefore more profitable, to work rich copper ore rather than poor copper ore (p. 19).[12]

The first clear distinction between fixed and variable costs was made, in the literature, by Charles Babbage in the 1830s (Parker, 1969, pp. 59–60). A clear recognition of the differential behaviour of costs is displayed much earlier, however, in both personal correspondence and business records. In a letter to John Taylor (11 May 1824) Richard Cort, accountant (son of Henry Cort who is usually credited with inventing the 'puddling process' of iron-making), states that 'the increased scale of smelting lessens also the [impact of] fixed expenses, which . . . are as much on 1,000 as on 6,000 tons'. Such costs are also contrasted with 'all other items which move more or less in proportion to the quantity of ores smelted' (p. 105). In a similar vein Josiah Wedgwood, proprietor of the Stoke on Trent pottery works, observed (1772) that some expenses 'move like clockwork & are much the same whether the quantity of goods [produced] be large or small' (McKendrick, 1970, p. 55).

The recognition of a clear distinction between fixed and variable costs is given precise practical application by the accountant at the Melincryddan works in the 1740s, when attempting to assess whether it would be more beneficial, from a cost/profit viewpoint, to locate production at Neath or Redbrook. Calculations are made of the relative costs of producing and selling five, six, seven and eight tons of copper per week at each of these locations. Some costs are the same at either location, e.g. the copper ore purchased in Cornwall; other costs differ, e.g. the freight costs from St Ives to Redbrook are much higher than from St Ives to Neath. Of the 16 elements of total cost, ten are treated as directly variable with production, three as semi-variable and three as entirely fixed. The total costings are then compared with estimated sales revenue to show an advantage for Neath at each planned level of production.

The financial analysis is accompanied by a splendid discussion which starts by outlining the various economic conditions which must be favourable in order to justify siting a works at a particular location. An assessment is then made of the extent to which these features are available at the chosen location compared with the principal alternatives. Care is taken to point out the uncertainty which attaches to some calculations compared with the reliability of others. For example: 'The last article of 4 pound a week for wear and tear is no doubt lyable to more uncertainty, than any of the rest; I can only say that I have consulted several who are supposed to have good judgement in these matters and they think it would not amount to so much' (p. 30).

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[11] £126 represented the measured value of 1 ton of copper based upon the current selling price of copper ore. This measure was commonly referred to as the 'copper standard' and its significance is explained in detail by Newell (1986).

[12] Lower material costs (far less rich ore was required) were outweighed by the significantly higher labour and fuel costs involved in the more difficult task of physically reducing rich copper ores.

The Tredegar manuscripts record consideration being given (1746), by the lessors, to the renewal of a lease yielding £150 per annum, or whether instead to take over and operate the iron works located on the land. The lessors estimate that £7,600 would have to be invested to cover the cost of fixed assets and operating expenses over the first twelve months. The conclusion reached is that a minimum of £530 would therefore need to be generated to cover interest at 5% on £7,600, i.e. £380, and the rental forgone of £150. The calculation (pp. 187–9), although open to criticism on the grounds that the £7,600 capital investment includes £50 a week paid to labourers over the first twelve month period of operations, represents a creditable early attempt to apply the opportunity cost concept to industrial decision making.

Clear recognition of the impact of changing levels of output on selling price and profit is contained in a calculation made by John Vivian, deputy governor of the Cornish Metal Company (1785). He shows that the sale of three-quarters of available copper capacity enables a higher price to be charged, and produces a higher profit, than selling the entire capacity, so that 'it will be in [the mine owner's] interest to keep the overplus in reserve, in hope of an increased demand or a decreased produce' (p. 190).

Further calculations made by John Vivian, for the Mona Mine Company in 1811 (p. 204) and 1813 (p. 191), clearly recognise the impact of different qualities of copper ore on yields and production costs. The 1811 calculation shows that the better quality ore ($5\frac{1}{8}$ tons as compared with $11\frac{3}{4}$ tons of copper ore required to produce one ton of copper) yields a higher absolute profit on an input of 100 tons. To take the analysis a little further the profit is expressed as a percentage of the cost of production and, although one might question the relevance of this comparison, it does display a determination to identify relevant measures as the basis for resource allocation decisions.

In 1828 we find the management of the Mona Mine Company concerned to discover whether to continue smelting copper ore at the Anglesey Smelting Works, with the finished goods marketed in Liverpool, or instead to sell more copper ore through Swansea. Calculations which favour the second option are then subjected to a kind of sensitivity analysis by the accountant Thomas Beer, with the financial effects of a series of assumptions more favourable to Liverpool incorporated in the calculation (pp. 231–6). The Swansea option retained its advantage, however, and the Anglesey works was closed in 1833. In the same year the company engaged a civil engineer, Charles Vignoles, to explore the possibility of laying down a railway using horse-drawn waggons to run from the Parys and Mona Mines to the port at Amlwch, instead of continuing to engage carriages. A calculation of the cost differential in favour of construction concludes that the initial investment of £5,354 would be paid back within about three years (pp. 237–41).

We can therefore see that a wide range of business decisions—such as whether to produce, how much to produce, what price to charge, where to locate a works, what quality of materials to employ, whether to close down, and how to transport goods to consumers—were the subject of financial analysis between 1700 and 1830. Few of the calculations are prepared in the same manner as would be employed today, and no doubt some of them resulted in wrong decisions being reached (e.g. the Anglesey Smelting Works reopened in 1838, although we do not know the extent to which circumstances had changed during the interim period), but the mere fact that a wide range of fairly complicated calculations were made proves that businessmen believed they provided a useful input to the management decision making process.

### *Return on Capital Invested*

Johnson (1984) links the need for calculations of the percentage return on capital invested (ROI) with the twentieth century development of vertically integrated and multi-divisional organisations. He explains the growing popularity of ROI on the grounds that it provided a more effective means of allocating resources than the capital market. It should not, however, be assumed that the development of the ROI awaited the emergence of such conglomerates. The relationship between profit and capital investment was made by Hamilton as early as 1777 and, while Mepham may well be right to claim that 'Hamilton was the only eighteenth-century writer, of an English-language accounting text, to discuss the topic' (1988a, p. 63), Pollard's assertion that businessmen never used this measure (1965, p. 235) is certainly wrong.

Robert Morris estimated that 'Profit from May 1727 when [Lockwood, Morris & Co.] was formed to Michaelmas 1728 was about £2,900, which upon a capital of £10,000 was 23 per cent per annum granting the time to be one year and a quarter' (p. 20). One hundred years later we find Richard Cort commenting that the British Iron Company's reported profit for 1826, of £11,000, is 'about 4 per cent on £267,616 total amount of real capital employed' (p. 186), and this is contrasted unfavourably with the company's prospectus which forecast a return of 20% (p. 216).

### *Interest as a Business Cost*

According to Pollard, 'Interest was treated as a cost, universally in computing the advisability of planned ventures, but frequently also in accounts of the past' (1963, p. 80). While use of the terms 'universally' and, even, 'frequently' are possibly too strong, Pollard's conclusions receive a measure of support from Jones's findings and from elsewhere in the literature.

Many of the financial calculations prepared for Welsh companies (considered in the previous sections) to enable management to assess performance and choose between alternatives incorporate an allowance for interest, usually at 5%. (This compares to a rate of 4% used in the 1746 cost estimate for the Heathfield Furnace: Straker, 1931, p. 200.) The inclusion of an interest charge in the routine *post facto* accounts was, however, usually confined to partnerships, where the deduction was designed principally to ensure that individuals were properly remunerated for differential capital contributions, rather than to produce a more accurate costing of business operations, e.g. in the Crawshay ledger for 1791–8 (p. 169). Elsewhere, Mepham tells us that the accounts of the British Linen Company (1748) include an interest charge as part of the agreed profit sharing scheme between the partners (1988a, p. 67). At the Charlton (cotton) Mills, by way of contrast, the calculated cost of business operations clearly includes interest imputed at 5% on the owners' capital investment from 1810 onwards (Stone, 1973, p. 77). One further example of an interest charge in *post facto* accounts is contained in a calculation prepared for the Mona Mine Company covering the seven years to 31 March 1800. The actual profit earned is compared with an interest charge of 10% on 'average capital employed' to produce a shortfall designated 'loss by the mine, £29,789.15.10' (p. 171).

### *Overheads*

The increased importance of overheads as a proportion of total production costs has been put forward, in some quarters, as an important reason for a growth of interest in cost accounting during the industrial revolution. This seems to be an over-simplification for the following reasons: central administration costs were sometimes very high under the domestic system even prior to the industrial revolution (Wells, 1977, p. 47); in many industries where costing techniques emerged during the industrial revolution, overheads were often not a significant element of total cost; the relevant costs which need to be collected together for decision making purposes are often direct rather than indirect costs.

The evidence presented so far displays neither a preoccupation with overheads, nor any indication that their relative weight significantly influenced the preparation of costing data. A much more important stimulus was the need to make business decisions and the costs included in the analysis depended on the nature of the operations under consideration.

Jones draws attention to the fact that, during the early years of the eighteenth century, it was possible to identify almost all industrial costs directly with production, since overheads were at a low level (p. 100). Properties were invariably leased, rather than owned, so that the rental charge could be included as a cost of production. While the furnace and utensils would have a long life, perhaps the entire period of the lease, so it was usually considered sufficient to charge associated maintenance and repair to production. Indeed, the word depreciation is nowhere to be found in the early records examined by Jones and, although the term wear and tear sometimes appears, it is thought probably to refer to the cost of keeping an asset in good condition. The first hint of systematic depreciation is found in the records of the Stanley Smelting Company for 1788/9, but insufficient information is available, even there, to establish the precise significance of the following journal entry: 'To Stanley buildings for 10 per cent on first cost . . . £500' (p. 159). Certain items of overhead are included in the costings prepared by Daniel Peck, 1707 (p. 15), and Robert Morris, 1730 (p. 23).

A big step forward is taken at the Cyfarthfa Company (1791–8) where production overheads are re-charged to cost centres and general overheads are written off in the profit and loss account (see next section). At the Cambrian Smelting Company, 1822 (p. 104), and the Mona Mine Company, 1830 (p. 106), we are told that overheads were recharged using the direct labour hour method and the prime cost method respectively. Clearly these methods were not improved upon for some time since Thomas Battersby, accountant, tells us that the percentage on prime cost was the most widely used overhead recovery method in Britain in 1878, and even 1898 (see Solomons, 1952, pp. 22–3).

### *Integrated Cost and Financial Records*

Johnson claims (1981) that it was the early nineteenth century textile factories which first applied the principles of double entry bookkeeping to the maintenance of cost accounts. However, Jones has shown that the Cyfarthfa Company used, from at least 1791, a system of double entry bookkeeping to charge individual cost centres with the direct and indirect costs involved in the conversion of raw materials into finished goods. Operations were divided between twelve distinct production centres; direct expenses were allocated to each of these and production overheads—e.g. blacksmith-work, the cost of operating the furnace engine, and other furnace charges—were apportioned between them. A 'manufacturing' account was periodically prepared for each production centre containing quantities and values for opening and closing stock. The balances were transferred to the general profit and loss account where non-allocated overhead costs, such as interest, common charges etc., were also accumulated.

In a number of cases the output of one production centre was transferred to another, e.g. the output of pig iron produced at the Cyfarthfa furnace was allocated between the pig iron account, the castings account, and scrap. Transfers to pig iron production and castings were priced, internally, at 90s. per ton, and to scrap iron (which was recycled to castings at the same price) at 60s per ton (p. 132). For 1820, by which time the size of the concern had quadrupled, there is information available regarding the methods used to apportion overheads between production centres, e.g. charges on the 'furnaces overhead account' totalling £6,885.0s.8d were apportioned to individual furnaces on a time basis (p. 136, n 32).

The ledgers of the Mona Mine Company, commencing in 1817, are a further early illustration of integrated cost and financial records. There is much evidence of care being taken to ensure a proper allocation of expenses between the mine and the smelting works and, beyond that, between different production centres. The records are designed to enable the presentation of monthly and quarterly statements of operations, and interest in cash forecasting is reflected by a statement prepared in 1817 which shows estimated inflows and outflows for the period June-November (pp. 138–40).

Why did businessmen begin to show more interest in the preparation of total cost figures? To suggest that costs were used to fix prices would undoubtedly be an over-simplification. In some industries, such as engineering, total costings were no doubt used to help management arrive at individual tenders. But in most industries, being highly competitive, price was fixed by the market and a businessman could only decide whether to supply goods at that figure. Often the pricing mechanism operated somewhere between the two possible extremes of pure monopoly and perfect competition and it is probably for this reason that Jones, based on his reading of the Dowlais Iron Company Letter books 1784–1852, reached the conclusion that in fixing prices 'management looked backwards at calculated book costs and forward to gauging what the traffic will bear' (p. 110).

## Relationship between theory and practice

Developments in accounting practice have, in general, preceded developments in theory, if we view theory as the literature available on the subject. Primitive accounting systems were in operation before the development of the written word and Pacioli—'the father of modern accounting'—acknowledges that he was simply describing existing practice when he prepared the first publication to contain a substantial treatise on double entry bookkeeping. It is, at the same time, acknowledged that the literature often describes the practices used by only a small minority of more advanced contemporary business organisations. Indeed, the large number of texts extolling the virtues and describing the features of double entry bookkeeping, published during Tudor and Stuart times, is in sharp contrast to the poor standard of the accounting systems used by merchants and bankers at that time (Yamey, 1962, pp. 25–37). But we may safely assume that there were some firms whose records matched the theoretical ideal described in the literature, and even contained refinements not dealt with there.

The amount of early literature dealing with industrial cost accounting procedures is scarce, by comparison, but, in common with its financial accounting counterpart, there is no close match with prevailing practice. Only four works in the English language have been identified as dealing with industrial costing prior to 1800; none of these appeared until more than 200 years after the initial publication of Pacioli's text, and little of substance was added to them until the seminal work of Garcke and Fells (1887). John Collins (1697) demonstrates the application of double entry techniques to trace the transfer of materials to the process account of a dyer. James Dodson (1750) uses a shoemaker's accounts to demonstrate the operation of what would today be described as a system of batch costing, i.e. the costing of individual batches of shoes made up from leather by artisans functioning under the putting-out system. Wardhaugh Thompson (1777) illustrates process costing for a thread hosiery, while Robert Hamilton (1777–9) illustrates the costing procedures appropriate for both a shoemaker and a textile firm.[13]

Each of these books deals principally with businesses operating under the domestic system, i.e. transactions are with 'outsiders', and so the accounting principles involved are little different from those associated with a simple trading transaction. Concentration on the domestic system is not, however, particularly surprising in view of the fact that most manufacturing activity was organised in this manner at that time. Only Hamilton deals with the accounting requirements of factory-based production, and he describes a system which is designed to trace the internal movement of stock and to accumulate costs as raw materials are transformed into finished goods. In addition, the productivity of supervised workers is measured by comparing their daily rate of pay with that which would have been charged had the materials been processed by outworkers (Mepham 1988a, pp. 58–9).

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[13] The contributions of these four writers are examined by Edwards (1937b, pp. 225–31 & pp. 253–4), Garner (1954, pp. 33–41) and Mepham (1988a—Hamilton only).

Even Hamilton makes no mention of overheads, but this is not necessarily a signal of ignorance. Alternative explanations are that overheads were at a modest level and/or their apportionment was not required for pricing purposes and would not have led to improved resource allocation decisions. The accounting method advocated by Hamilton allowed management to concentrate on relative contributions, when assessing performance, and it relied on them to set prices at a level sufficient to ensure adequate margins in the long run.

Evidence presently available concerning the accounting practices employed by manufacturing companies, in Britain, prior to 1830 suggest that the integration of cost and financial records, in the manner described by Hamilton, was matched by few businesses. Indeed, according to Hamilton 'Artificers and manufacturers sometimes keep only a day book and ledger; the former, for entering goods sold, or work done on credit; the latter for personal accompts; And perhaps a cash and invoice-book' (quoted in Mepham 1988b, p. 327). The earliest known example of a determined attempt being made to achieve integration is in the ledgers of the Cyfarthfa Company for 1791–8, and the Charlton (cotton) Mills (1810) and the Mona Mine Company (1817) are the only other examples which can safely be cited for the period under consideration.

It is clear, however, that many companies were using, in much earlier times, a wide range of accounting techniques to identify costs incurred in the past and likely to be incurred in the future as the basis for performance assessment and resource allocation decisions. These kinds of calculations appear to have received little or no attention from contemporary writers of accounting texts, presumably because they were made outside the system of double entry bookkeeping which remained the main focus for attention.

## Estate accounting

The focus of this article is industrial cost accounting, but it would be a mistake to draw any broad conclusions about its development without first referring to some of the findings presented in Jones's chapter on estate accounting. An estate obviously exhibits many different features from an industrial concern, but there are also numerous similarities. In both cases there is the need to control the activities of agents and employees. Moreover, in an estate of any size, a number of activities are likely to be undertaken, requiring choices to be made, and, therefore, causing their relative profitability to be of interest to the owner.

On the Mackworth Estate (Neath), 1759–60, there was in operation a 'hybrid' scheme of bookkeeping designed to enable the preparation of charge and discharge type of statements (the traditional method of estate accounting), while also involving the maintenance of a ledger, kept on double-entry principles, and organised in such a way as to help identify the income, costs and profits of separate operations. A profit and loss account for the year ending 13 December 1760 matches profits arising from a range of activities—including coal, wheat, barley, brickmaking—with overhead costs such as maintenance of the gardens, household expenses, servants' wages and general charges (p. 56). The format is much the same as the Cyfarthfa account for 1791.

Also of interest is an unpublished treatise written by Thomas Lovett, chief agent at the Chirk Castle estate, in the 1760s. This contains a detailed budgeting exercise undertaken to help decide whether it was worthwhile farming, in a particular manner, 400 acres of land (pp. 63–72). The main stages involved in the analysis are as follows:

1. Land is allocated between growing various types of crops, hay, and pasturage.
2. The pasturage is allocated between different types of animals—cows, sheep, horses etc.—based on their acreage requirements.
3. The investment needed to stock the farm with the appropriate number of animals and provide the necessary farming implements is established, with a full build-up provided of each item in the budget.
4. A forecast is made of annual running costs including the rent which must be paid to the landlord, 'wear and tear in the implements of husbandry . . . and the decay in the dairy utensils' (p. 68). Supporting schedules again show how the main items have been computed. To this total is added an allowance for interest at 10% on capital invested 'in consideration of his trouble in conducting business and the hazzard he runs in the loss of cattle, etc.' (p. 68).
5. Detailed calculations are made of the amounts likely to be received for the sale of crops, animals, and their produce.
6. Total revenues are compared with total running costs, including the interest allowance on capital invested, to give the balance of 'neat profit'.

A discussion attached to the numerical analysis fully acknowledges the fact that many of the calculations are 'mere suppositions' (p. 71). The assumptions which have been made are also stated. Jones points out that Lovatt's statement interlinks 'on a detailed budgetary basis, investment and return. He integrates into the one whole of an income statement, the cash flow results of making a decision to invest in and operate a 400 acre farm for a year' (p. 72). The analysis makes no reference to double entry but carefully distinguishes between capital and revenue items. The preparation of an annual profit statement is central to the entire exercise, but no mention is made of the balance sheet which is presumably considered to be of no significance.

## Conclusion

Much of what has been written on the historical development of cost accounting has focussed on what might be described as 'single variable solutions'. The level of industrialisation, the relative impact of fixed and variable costs, and the organisational structure of business activity have each been identified as principal causal factors. The conclusion reached here is that such explanations for the development of cost accounting, although intuitively plausible, are unlikely to stand up to close scrutiny. Cost accounting has developed to serve management in an increasingly complex and constantly changing social and economic environment. The variety of the costing procedures employed before 1830, their *ad hoc* nature, and the widely differing circumstances in which innovations occurred, demonstrate the contingent nature of the contemporary accounting framework. In these conditions the manager first decided what he wanted to do—plan, choose or control—and then structured the information accordingly. When the problem changed so did the information required and generated.

This analysis does not of course in any way deny the importance of individual influences at particular locations and at particular points in time but, even then, it is necessary to re-appraise generalisations which have been made in the light of new findings. For example, Johnson contends that the organisational features of factory-based manufacturing processes stimulated the development of costing techniques for the purposes of assessment and decision making. Jones's findings contain nothing which conflicts with this general idea, but what he does demonstrate is that this organisational feature was present in Welsh metal companies in the early eighteenth century, whereas Johnson's broad focus of attention is one hundred years later. Jones also shows us that these companies developed a range of costing techniques to help reach the right decisions, coming to fruition at the Cyfarthfa Iron Works in the 1790s. The roots of industrial cost accounting, within the factory, must now be seen to pre-date, significantly, the industrial revolution.[14] He also shows that the incorporation of costing procedures *within* a system of double entry bookkeeping is first associated with an ironworks in the 1790s rather than a cotton mill in 1810.[15] We also need to recognise that some of the developments previously associated with the factory, e.g. the integration of cost and financial records within a double entry framework, were worked out on the large estates, where problems of planning decision making and control were first experienced.

The calculations, described by Jones, range of course from the clear and sophisticated to the convoluted and obscure. In making this judgement, one needs to be mindful of the fact that accounting historians are, sometimes justifiably, criticised on the grounds that they assess past practices by reference to present day standards. The fairer, and more relevant, yardsticks are: what level of expertise was available at the time?; and, to what extent did methods used, however primitive, enable businessmen to reach the right decisions? Unfortunately, the information is not yet available to enable these kinds of judgements to be made with any degree of confidence. Quite probably, insufficient data has survived to enable entirely reliable conclusions ever to be reached. What is clear from Jones's thesis, however, is that early Welsh industrialists, operating in far less literate times, went to considerable lengths in the attempt to assemble figures, and make observations, designed to achieve the most effective use of scarce resources. If the information made available proved inadequate for this purpose, it was not for want of trying. Indeed, perseverance over time with these calculations seems more likely to reflect a clear conviction of their value.

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[14] The records of the substantial Newmills Cloth Manufactory established in 1681 (in 1683 there were 726 employees) would no doubt repay further investigation. According to Marshall (1980) they demonstrate modern capitalistic traits such as 'the desire to expand along rational principles, closing of less profitable lines of production in order to expand more profitable lines, continuously estimating returns and reinvesting in the areas of highest expected yield, attempting continually to increase productivity and output, and economically rational organization of the labour-force' (p. 129). Evidence is presented to show that the company used double entry bookkeeping, at least from 1692 (p. 157), a system of regular balancing, profit calculation and balance sheet presentation (pp. 156–57), and generally to keep track and control the movement of resources. We are also told that management followed the market and maximised profit by increasing production (p. 166) and concentrating on more profitable lines (p. 193). Little is said, however, about how the accounting system was designed to provide relevant information about costs, revenues and output in order to enable these objectives to be achieved. Also of interest, in this context, is an early seventeenth century notebook found among the manuscripts of the Duke of Northumberland at Alnwick Castle. A printed version has been produced by Hammersley (1986) which contains a number of costings and profit calculations for mining and metal smelting activities.

[15] Campbell (1961) seems to suggest that the Scottish Carron Company might have operated an integrated system from 1769, though his text is not entirely clear on this matter (pp. 136–7).

Jones's findings may therefore be contrasted with the bleak observation made by Pollard concerning the nature, and usefulness of accounting systems in use during the industrial revolution. Namely, that 'The practice of using accounts as direct aids to management was not one of the achievements of the British industrial revolution; in a sense, it does not even belong to the later nineteenth century, but to the twentieth' (1965, p. 248). It is also interesting to note that these two historians have very different views about the quality of the accounting records in use even at a particular business, the Mona Mine Company. According to Pollard 'the early accounts [1770s] were so badly kept as to be almost useless; but even in later years Pasco Grenfell and John Sanderson, Uxbridge's Agent, complained of their inadequacy' (1965, p. 229). This contrasts with the numerous costing calculations detailed by Jones, and his conclusion that the company operated a 'system of book-keeping squarely based on double-entry' (p. 145). Perhaps part of the explanation for this dichotomy is that the economic historian has rather grander ideas of the potential of management information systems, in use in earlier times *and* today, than does the accountant.

Jones's book does not add much to our knowledge of the development of periodic profit measurement procedures and the preparation of final accounts. Some of the practices described—no reference to depreciation until 1788, bad debts written off against the capital account in the 1790s, and the first reference to a provision for bad debts being made in the 1830s—seem rudimentary by comparison with procedures we know were in use elsewhere and those described in contemporary textbooks. The relatively primitive financial accounting procedures discussed are in sharp contrast with the perceptive thought processes which enabled the preparation of costings for a variety of management decisions.

This is a valuable new insight and should cause us to reappraise our ideas about the relative sophistication of financial and cost accounting systems in operation in earlier times. There has been a tendency for writers to concentrate on the quality of double entry bookkeeping procedures, and to cast doubt on the usefulness of surviving accounting statements and, from this, a lack of interest in such documentation has been inferred. Admittedly some historians have been unwilling to accept, unreservedly, such conclusions, pointing out that management information systems, when developed outside robust leather-bound ledgers, *may* simply not have survived. Jones has gone further and demonstrated that a thorough search of available repositories reveals evidence of the extensive use of cost accounting information, in earlier times, for the purposes of planning, decision-making and control.

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# The Use of Computers in Accountancy Courses: A New Perspective

**M. C. Er and A. C. Ng***

**Abstract**—Bhaskar (1982, 1983) proposed a list of 26 topics, classified under three categories (computer science, computer as a computational tool, computer-aided instruction), for the use of computers in accountancy courses. This scheme is argued to be confusing, as some topics are classified wrongly, and is replaced by a new seven-category scheme. Among other things, computer-aided instruction is found to have doubtful value as judged from the collected experimental evidences. An important question is raised as to the necessity and desirability of the use of computers in accountancy courses. It is argued that not all topics proposed by Bhaskar are absolutely necessary, and that his list contains disturbing omissions and unrealistic expectations of accounting students' time. A new list of necessary computing topics is proposed. Each topic requires 2–3 hours of terminal time during a supervised laboratory session, and can be incorporated easily into existing accounting curricula. It is felt that a postgraduate diploma should be introduced for accounting graduates to cover the ever expanding fields of computer science, artificial intelligence, information systems, and their utilisation in accountancy. Finally, in the light of the Japanese fifth generation project, it is argued that the computer should be viewed as the accountant's intelligent assistant rather than merely as a computational tool.

## Introduction

The impact of computers on organisations and societies has been phenomenal (Er, 1987). In recent years, an increasing number of researchers have proposed various ways of incorporating the use of computers in accountancy courses. Hopwell and Myklebust (1984) bluntly suggest that the first thing to do is to get accounting teachers to use computers. Engle and Joseph (1986) describe the use of integrated computer assignments in accounting information systems courses. Romney (1985) describes the use of microcomputers in different accounting classes. Vasarhelyi and Lin (1985) describe the development of the TREAT system and its use in an EDP auditing course.

The most comprehensive proposal for implementing the use of computers in accountancy courses was given by Bhaskar (1982, 1983). Collins (1983) subsequently raised some contentious issues with regard to Bhaskar's claims, which have not been adequately answered (Bhaskar and Kaye, 1985). Since then, no new proposal with regard to the use of computers in accountancy courses has been put forward.

In view of the rapid development of computer technology and its likely impact on the accounting profession, this paper takes a fresh look at the contentious issues in the light of new developments in recent years. It is intended to shed light on some of the neglected areas untouched by Bhaskar and to provide a more balanced view of the use of computers in accountancy courses. In particular, the necessity and desirability of the use of computers in accountancy courses are discussed in detail. A new set of computing topics that satisfies the necessity requirements is suggested. An alternative to lengthening the accountancy programme in order to accommodate the computing requirements is proposed.

## A new classification

Bhaskar (1982, 1983) classified the use of computers in accountancy courses into three categories: computer science, computer as a computational tool (CCT), and computer-aided instruction (CAI). Such a classification scheme appears to be confusing, to say the least. There are topics that are classified into more than one category or misclassified into wrong categories—a reflection of the weaknesses of Bhaskar's classification scheme.

To gain a better understanding of Bhaskar's proposed use of computers in accountancy courses, it is necessary to re-classify them. The following seven categories seem to capture all the proposed use of computers:

(i) Computing (Comp);
(ii) Computer simulation and modelling (CSM);
(iii) Decision support (DS);
(iv) Business appreciation (BA);

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*M. C. Er is Foundation Professor at St. Patrick's College, National University of Ireland. A. C. Ng teaches at the School of Accounting, Curtin University of Technology, Western Australia. The authors wish to thank two anonymous referees for their constructive comments.

(v) Mathematical programming (MP);
(vi) Accounting information systems (AIS);
(vii) Computer-aided learning (CAL).

Each category is discussed more fully below. The strength of this new classification scheme is that none of the topics is included in more than one category.

*Computing (Comp)*

The term computing is narrower than computer science in the sense that it covers a small subset of subjects in computer science. It is used generally to refer to the studies of basic skills for programming the computer to perform information processing tasks. Subjects included in computing are: computer programming, computer systems, data structures, data processing, operating systems, compilers, computer networks and data communications, computer graphics, database management systems and fourth generation programming languages. Excluded are theory of computation, semantics of programming languages, artificial intelligence, expert systems, parallel computation, analysis of algorithms and complexity, VLSI design, functional and logic programming, supercomputers, and other advanced topics. Acquaintance with computing allows one to program conventional computers without fear.

*Computer Simulation and Modelling (CSM)*

Computer simulation and modelling can refer to a wide variety of topics involving simulation and modelling with computers. But in the present context it refers to simulation and modelling of firms using quantitative, statistical and probabilistic techniques with computers. Of interest is the use of a proprietary simulation system.

*Decision Support (DS)*

Decision support refers to the use of accounting information for management decision making. It covers cost-volume-profit analysis (Mole, 1986), sales forecasting, investment appraisal, cash-flow analysis, variance analysis, and decision under uncertainty. The general paradigm is to use the 'what-if' technique involving changing values of parameters subject to certain constraints. It is more convenient to use computers to do recalculations than not, but the emphasis is more on the understanding of the techniques.

*Business Appreciation (BA)*

Business appreciation refers to the need to understand in an integrated manner complex business decision making and how it affects and is in turn affected by the market. For instance, how much money should be spent on advertising, production, plant and machinery, personnel, research and development, and how much should be borrowed from banks? Because of the difficulty in controlling the environment, the studies are normally carried out through management and business games using simplified models of the economy. Obviously, a computer is needed in order to achieve fast response.

*Mathematical Programming (MP)*

Mathematical programming generally refers to optimisation subject to constraints in the business and the production contexts. Topics included are: linear programming, operational research, econometric techniques, dynamic programming, nonlinear optimisation. Because of tedious repetitive calculations, a computer is generally used.

*Accounting Information Systems (AIS)*

Accounting information systems refer to computer-based information systems for processing accounting data. Topics included are sales systems, accounting systems (sales ledger, purchasing and nominal ledger, payroll system, etc), and budgeting and costing systems. Generally speaking, accounting information systems are straightforward implementations of manual systems, with built-in controls.

*Computer-Aided Learning (CAL)*

Computer-aided learning refers to the use of the computer as the medium of instruction for assisting the reader in a learning process, as opposed to static printed texts and pictures. Because of its computational flexibility, a computer can be programmed to generate extra remedial lessons and exercises to assist weaker students who make repeated mistakes in some particular areas. In theory, all written texts and lectures can be turned into CAL lessons, but the real challenge is to make use of the hypertext facilities (Conklin, 1987) to create animated lessons. A research problem in this area is how to program a computer to understand the mistakes made by students so that relevant remedial lessons can be automatically generated to suit the needs of individual students.

Using the above seven categories, Bhaskar's (1983) list accountancy programmes which use computers can be more precisely and correctly classified as shown in Appendix 1. The result is an improvement in clarity, which reflects more truly the nature of the range of topics proposed by Bhaskar. In contrast, Bhaskar's classification scheme reflects uncertainty in classifying 'interpretation of Financial Reports' (CCT/CAI), 'Advanced Financial Reporting' (CCT/CAI), and 'A CAI package to aid the teaching of security and control within a computerised accounting system' (CCT/CS). Furthermore, certain topics are classified wrongly by Bhaskar because there are not suitable categories for them. Good examples are 'Sales System 1', 'An Accounting System', 'Sales System 2', 'A number of Accounting Systems and Business Systems', 'A number of Commercial Accounting Systems'. These are all classified under Computer Science (CS), but in reality they have nothing to do with Computer Science as defined by Bhaskar (1982).

## Necessity versus desirability

Although Bhaskar (1983) described three different levels of curricula with different degrees of usage of computers in accountancy courses, he did not distinguish what was necessary and what was desirable. As a result, there is a danger of being too easily carried away by enthusiasm. In this section, the issue of necessity versus desirability is discussed together with some contentious issues which cannot be ignored. Necessary materials are those core materials that are essential for an understanding of accounting theories, concepts or practices. Desirable materials are those peripheral materials which can, if time permits, enhance understanding of theories, concepts or practices.

### *Unrealistic Terminal Time*

Bhaskar (1983) proposed that the 7 topics in year 1 of the accountancy programme could be covered in 3–5 terminal hours per week per student, the 9 topics in year 2 in 3–10 terminal hours per week per student, and the 10 topics in year 3 in unspecified terminal hours per week per student. First of all, one is surprised by the fact that no exact figures of terminal time are given, especially in relation to the year 3 accountancy programme. This can only create uncertainty in the reader's mind. Secondly, the terminal times given for years 2 and 3 are totally unrealistic. For example, the teaching of computer programming cannot be accomplished in 3–5 terminal hours per week per student, together with six other topics to do at the same time—it requires another 9 hours per week on top of the 3 terminal hours per week of scheduled programming laboratory unless the programming exercises are so trivial that they do not deserve implementation at all. Corrections of syntactic errors and debugging of program logic can take up unexpectedly long hours of terminal time especially for novice programmers. It appears that Bhaskar (1983) has grossly underestimated the required terminal times.

### *The High Cost of CAL*

The prohibitively high cost of producing CAL lessons, especially for local needs, is well known (Peterson, 1980). Given the unconvincing experimental results collected so far (McKeown, 1976), there is no justification for insisting on using CAL packages in accountancy courses given the calls (Fellows and Spence, 1985; Cargile and Bublitz, 1986) for more time for accounting staff to carry out research and publications. It is therefore surprising to find that, instead of improving McKeown's (1976) experiments to prove his case, Bhaskar argued that: 'This failure is partially due to the inherent problems of conducting such research studies with the underlying methodological and philosophical limitations but also to the questionable relevance of such studies' (Bhaskar and Kaye, 1985). After all, Bhaskar has not been able to show why McKeown's (1976) experiments are methodologically and philosophically limited and why his experiments are irrelevant. One is vividly reminded by Bhaskar (1982) that McKeown's (1976) experiments were regarded as seminal even by Bhaskar himself. The reader is puzzled by the contradiction. In the absence of any convincing explanation, it is safer to regard the use of CAL packages as a luxury in accountancy courses. In reality, the use of CAL packages is not widespread even in computer science departments which are considered to be technologically advanced; so why should accountancy departments serve as guinea pigs in the CAL area?

### *More Computing versus More Law, Finance, Management, Economics*

The use of students' time has reached saturation point. It is impossible to squeeze more computing components into the accountancy programme, which has a finite number of years, without taking out some other components in the areas of law, finance, management and economics. The arguments for more law, more finance, more management, and more economics are as compelling as the arguments for more computing. Thus accounting educators must strike a delicate balance between the various competing demands, rather than letting their preferences bias the accountancy curriculum. It has not been demonstrated how the proposed greater use of computers in the accountancy programme can be accommodated without sacrificing these other subjects traditionally closely associated with accountancy.

### *Relevance of Computing to Learning Accounting Concepts*

The relevance of computing to learning accounting concepts has not been proven. As Bhaskar and Kaye (1985) put it: '. . . the use of computers as teaching devices is not proven . . .' Collins (1983) also pointed out: '. . . the computer adds little or nothing to the learning process.' Many researchers have set out to prove the relevance of computing to the learning process, but so far none of them has succeeded. For example, Borthick and Clark (1986) conducted an experiment to investigate the relevance of the use of microcomputers in accounting education to the role of productive thinking in affecting student learning. They found that 'there was no performance difference across treatment types'. More interestingly, 'results of this experiment revealed that students initially had a strong desire to use microcomputers, but that their enthusiasm diminished after the experiment' (Borthick and Clark, 1986). In a separate experiment, Jansson, Williams and Collens (1987) tested the relevance of computer programming to logical reasoning: unfortunately the finding was negative. Thus it appears that, from the experimental evidences collected so far, computing is irrelevant to the learning of accounting concepts.

### *Databases, 4 GLs, Word Processors, Spreadsheets and Computer Networks*

The greatest omissions from Bhaskar's (1983) proposed use of computers in accountancy programmes appear to be relational databases, fourth generation languages (4GLs), word processors (WPs), spreadsheets, and computer networks. In a survey of microcomputer competence requirements in the accounting industry, Waller and Gallum (1985) found that most accounting firms desire coverage of these topics in the accountancy programme. It seems that the skills and knowledge in operating software and hardware are more relevant to the day-to-day work of practising accountants than the long list of topics proposed by Bhaskar (1983). Thus relational databases, 4GLs, word processors, spreadsheets and computer networks should be taught in the accountancy programme if it incorporates any computing components at all.

### *Accounting Information Systems and Auditing*

As the use of computers is irrelevant to the learning of accounting concepts, the only compelling reason for the use of computers in accountancy courses is that accountants need to deal with computer-based accounting information systems and their subsequent auditing. In view of these practical needs, it is puzzling to find that the use of computers in auditing was not included in the list of topics proposed by Bhaskar (1983). The importance of computers in auditing need not be overstressed as it gives rise to the issue of appropriate internal controls of computer-based accounting information systems (Walsh, 1986; Bhaskar and Williams, 1986). Many authors have described different ways of running the accounting information systems and the computer auditing courses. Engle and Joseph (1986) describe an experimental accounting information system which allows students to experience the data entry and various internal control features of the system. Chandler (1984) goes further to describe his experience in involving students in the actual design and development of an accounting information system with accounting controls. Vasarhelyi and Lin (1985) describe an interactive generalised audit software known as TREAT for teaching computer auditing. Thus it appears that the accounting information systems and the computer auditing courses are well accepted into accounting curricula. It is fair to say that accounting information systems and computer auditing form the core of the use of computers in accountancy.

### *Expert Systems and Decision Support Systems*

Expert Systems (Feigenbaum, Buchanan and Lederberg, 1971; Shortliffe 1974; Feigenbaum and McCorduck, 1983) and decision support systems (Keen and Scott-Morton, 1978) have been around since the late 60s and late 70s, respectively. However, Bhaskar (1982, 1983) did not mention either, as if they were irrelevant to the use of computers in accountancy. On the contrary, their impact on accountancy and auditing has been increasingly felt in recent years (Abdolmohammadi, 1987; Connell, 1987). It is now recognised that the provision of accounting data by accounting information systems without the use of any decision support systems renders them less useful to the management for decision making. The use of expert systems in accountancy can be regarded as a logical step to extend the capabilities of decision support systems, especially in the areas of audit, taxation, financial planning, regulations and risk assessment.

## The necessary computing topics in an accountancy programme

From the above discussion, it seems clear that not all topics proposed by Bhaskar (1982, 1983) are absolutely essential to the practices of the accounting profession, and that some topics that are left out from his list turn out to be crucial to the day-to-day functions of the accountant in using computers. On balance, the following topics seem to be necessary for an understanding of computing and computers, and their utilisation in accountancy:

1. Computer programming;
2. Microcomputer applications;
3. Computer systems and systems programming;
4. Computer-based accounting information systems;
5. Computer auditing;
6. Expert decision support systems.

Other topics not mentioned are desirable if time permits. A more detailed description of the necessary topics is presented in Appendix 2. Justifications for the inclusion of the above topics in the necessary list are given more fully below.

*Computer Programming*

It is felt that accounting students should not merely treat a computer as a black box, and hence some understanding of the internal working of a computer is essential. The best way to learn about controlling a computer is to program it. Experience gained in computer programming will greatly enhance understanding of the various software to be used later. Moreover, the computer programming course will expose accounting students to algorithmic thinking which is totally different from the illustrative approach commonly used in introductory accounting courses. It is stated in Appendix 2 that 3 hours of supervised laboratory class per week are needed to give students the necessary practical experience in computer programming beside formal lectures. On top of that, another 9 hours per week are expected to be spent by each student to complete laboratory exercises and assignments at his or her own pace.

*Microcomputer Applications*

Working accountants commonly use word processors to prepare reports, spreadsheets to perform calculations, and fourth generation languages to retrieve accounting information from databases. Thus this course is absolutely essential to make accounting students acquainted with various kinds of software, which have become accountants' essential tools in the workplace.

*Computer Systems and Systems Programming*

The demystification of computers cannot be considered complete until one gains an elementary knowledge of the machine architecture and the workings of compilers, operating systems, computer networks, and data communications. This course is essential for making accounting students unafraid of computer technology, and to some extent, knowing where to look for further information about computer technology.

*Computer-based Accounting Information Systems*

This component is absolutely essential and should be included in the accounting information systems course, which also includes the manual systems. Students should be taught the various internal controls for computer-based accounting information systems in the contexts of both big corporations and small businesses.

*Computer Auditing*

For practising accountants, computer auditing is increasingly performed at installations of computer-based accounting information systems. As such, computer auditing should be taught to accounting students, some of them may become practising accountants in the future. Students should be taught how to use computers to carry out the compliance and substantive tests in an EDP environment.

*Expert Decision Support Systems*

Expert systems and decision support systems have been increasingly used in practice to assist decision making in auditing, taxation, financial planning, and risk assessment. The increasing mergers of expert systems and decision support systems create new breeds of software, generally called expert decision support systems. In these contexts, the computer is being used an an intelligent assistant/tool rather than as a computational tool as suggested by Bhaskar (1982, 1983). In the light of the unavoidable challenge posed by the Japanese fifth generation project (Feigenbaum and McCorduck, 1983), accounting students should be taught expert systems, decision support systems, and expert decision support systems so that they can use these tools to raise the quality of decisions made.

The terminal time for each topic listed in Appendix 2 is based on the authors' experiences in teaching accountancy and computer science courses, and the use of computers in accountancy courses. By terminal time, we mean scheduled laboratory time during which each student has access to a computer in order to do laboratory work under close supervision. It is worth pointing out that the supervised laboratory should be regarded as an integrated part of any computer training and education, especially for accounting students who need to adapt to algorithmic thinking. Students need to learn the trivia, such as commands for operating a computer and the syntax of a programming language, as well as conceptual skills, such as logical reasoning. The best way to learn those is to do carefully designed exercises on a computer in laboratory sessions during which expert advice is readily available. Apart from laboratory exercises, students should be given additional assignments in order to consolidate computer skills and knowledge. It is our experience that, for each supervised laboratory hour, each student needs to put in an additional three hours outside in order to complete laboratory exercises and assignments. The use of computers in accountancy courses has undoubtedly increased the demand on accounting students' time.

## Other alternatives

As pointed out above, there are conflicting demands on students' time. It is impossible to ask for more computing, more law, more finance, more management, and more economics with the same number of years to complete a basic bachelor degree. One obvious solution is to lengthen the accountancy programme by one year (such as the five-year undergraduate degree in accountancy preferred by the American Institute of Certified Public Accountants' Committee on Education and Experience Requirements). In view of the current economic climate and greater financial burdens placed on students, such an option has not received widespread acceptance among universities, colleges, parents and students.

An alternative is to introduce a postgraduate diploma to supplement the basic accountancy degree which covers most of the basic knowledge an accountant is expected to know. Such a postgraduate programme can cover computing and computers, and their utilisation in accountancy in more depth than would be possible in the traditional undergraduate accountancy programme. Of special interest would be a thorough exposure to computer science, artificial intelligence and information systems, and their utilisation in accountancy. This approach also takes the pressure off the universities, colleges, parents and students, all of which are increasingly under resource constraint in the face of inflation.

## Summary

The starting point of this paper is Bhaskar's papers (1982, 1983) which, though dated, have been the most comprehensive proposal for the use of computers in accountancy courses so far. His arguments and assumptions have been found to be incomplete or invalid, and have been superseded by subsequent developments. A new perspective for incorporating computing and information technology into accountancy curricula has been provided in this paper.

Bhaskar's classification of the use of computers in accountancy courses into three categories—computer science (CS), computer as a computational tool (CCT), and computer-aided instruction (CAI)—has been found to be confusing. A new classification scheme using seven categories—computing (Comp), computer simulation and modelling (CSM), decision support (DS), business appreciation (BA), mathematical programming (MP), accounting information systems (AIS), and computer-aided learning (CAL)—reflects more truly the nature of the range of topics proposed by Bhaskar. For example, in Bhaskar's classification, sales systems, accounting systems, and business systems are classified under CS, and budgeting and costing systems under CCT—which are not correct. In contrast, they are all classified under AIS in our new classification scheme, which is more appropriate.

An important question has been raised in this paper as to the necessity and desirability of the proposed use of computers in accountancy courses. Among other things, computer-aided instruction (CAI) or computer-aided learning (CAL) has been found to have doubtful value as judged from the experimental evidence collected so far, given the prohibitively high cost for producing CAI (CAL) lessons initially. It has been found that not all topics proposed by Bhaskar for the use of computers in accountancy courses are absolutely necessary, and his list contains disturbing omissions. His under-estimation of the demand on students' time required by his proposed use of computers in accountancy courses renders his proposal unrealistic and unworkable.

It is argued that the following topics are necessary for the understanding of computing and computers, and their utilisation in accountancy: computer programming, microcomputer applications, computer systems and systems programming, computer-based accounting information systems, computer auditing, expert decision support systems. From the authors' teaching experiences in Australia, Canada and Ireland, each of these topics requires about 2–3 hours of terminal time per week during a supervised laboratory session, and an additional 6–9 hours outside the supervised laboratory to complete laboratory exercises and assignments. Supervised laboratories are found to be essential for students to gain the necessary hands-on experiences because of the practical nature of the use of computers in accountancy courses. These core topics can be easily incorporated into existing accountancy curricula without seriously disrupting and lengthening accountancy programmes.

On balance, it is felt that a postgraduate diploma should be introduced specifically for accounting graduates to cover the ever expanding fields of computer science, artificial intelligence, information systems, and their increasing utilisation in accountancy. Such a postgraduate programme can provide a specialised treatment of more advanced topics on the use of computers in accountancy, which cannot be incorporated into the basic accounting degree programme due to time and resource constraints. It also provides an opportunity for old fashioned accountants, who feel a need to know about computing and information technology, to acquire new computing skills and knowledge, especially in the areas of personal computers, computer-based information systems, computer auditing, and expert systems.

In conclusion, because of the rapid development of computing and information technology, all computer related topics should be revised every five years. In the light of the challenge posed by the Japanese fifth generation project, one should use the computer as an intelligent assistant rather than merely as a computational tool as proposed by Bhaskar. Nevertheless, Bhaskar should be given the credit for being the first person to make the most comprehensive proposal for the use of computers in accountancy courses.

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## Appendix 1 The Use of Computers in an Accountancy Programme

The following is a list of computer packages and application programs classified under the revised category. Bhaskar's original classification is also listed side by side with our new classification as a comparison.

| | | *Our New Category* | *Bhaskar's Category* |
|---|---|---|---|
| *Year 1* | | | |
| 1.1 | The teaching of computer programming | Comp | CS |
| 1.2 | Financial simulation models | CSM | CCT |
| 1.3 | Quantitative accounting and statistical models | CSM | CCT |
| 1.4 | Revenue and cost structures | DS | CCT |
| 1.5 | Business games | BA | CCT |
| 1.6 | Sales systems 1 | AIS | CS |
| 1.7 | Double-entry book-keeping | CAL | CAI |
| *Year 2* | | | |
| 2.1 | Optimising models | MP | CCT |
| 2.2 | Econometric package | MP | CCT |
| 2.3 | Forecasting package | DS | CCT |

| | | |
|---|---|---|
| 2.4 Interpretation of financial reports | CAL | CCT/CAI |
| 2.5 An accounting system | AIS | CS |
| 2.6 Sales systems 2 | AIS | CS |
| 2.7 A more advanced computerised business game | BA | CCT |
| 2.8 Budgeting and costing systems | AIS | CCT |
| 2.9 Investment appraisal package | DS | CCT |
| *Year 3* | | |
| 3.1 Advanced financial reporting | CAL | CCT/CAI |
| 3.2 A probabilistic simulation package | CSM | CCT |
| 3.3 A proprietary modelling system | CSM | CCT |
| 3.4 A dynamic programming package | MP | CCT |
| 3.5 A number of accounting systems and business systems which run on 8 bit microprocessors | AIS | CS |
| 3.6 An illustrative package on accounting databases | Comp | CS |
| 3.7 Package dealing with decisions under uncertainty | DS | CCT |
| 3.8 More business games | BA | CCT |
| 3.9 A CAL package to aid the teaching of security and control within a computerised accounting system | CAL | CCT/CS |
| 3.10 A number of commercial accounting systems | AIS | CS |

## Appendix 2 The Necessary Computing Topics in an Accountancy Programme

The following is a list of topics that are necessary for the understanding of computing and computers, and their utilisation in accountancy courses.

| | *Terminal Time in Supervised Lab. (hours per week)*† | *Our Category* |
|---|---|---|
| *Year 1* | | |
| 1. Computer programming<br>(An elementary introduction to computer programming using COBOL.) | 3 | Comp |
| 2. Microcomputer applications<br>(Topics include word processors, spreadsheets, relational databases, database management systems, and fourth generation languages.) | 3 | Comp |
| *Year 2* | | |
| 3. Computer systems and systems programming<br>(An elementary introduction to basic machine architecture, compilers, operating systems, computer networks, and data communications.) | 3 | Comp |
| 4. Computer-based accounting information systems<br>(This component is to be taught in the accounting information system course which includes manual systems, with a general introduction to data processing.) | 2 | AIS |
| *Year 3* | | |
| 5. Computer auditing<br>(This component is to be taught in the auditing course, together with a discussion on the compliance and the substantive tests in EDP environments.) | 2 | AIS |
| 6. Expert decision support systems<br>(A general introduction to expert systems, decision support systems, and expert decision support systems, plus hands-on experience.) | 3 | DS |

†The terminal time stated is for the supervised laboratory class for each course which lasts for one semester. For each hour of supervised terminal time, each student is expected to spend another three hours to complete laboratory exercises and assignments at his or her own pace.

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# A Case Study on Interest Adjusted Accounting Using EEI

**John R. Grinyer and Abdussalam E. Elbadri***

**Abstract**—It can be claimed that the failure of conventional accounting explicitly to recognise the cost of capital is a major shortcoming during periods of high interest rates. Another important problem stems from the apparently arbitrary and incorrigible allocations typically involved in the matching process. Grinyer has previously proposed a theoretical solution to these problems using an allocation algorithm he called 'Earned Economic Income' (EEI). This paper outlines and illustrates a practical development from the EEI concept by means of a case study which explains the calculations and estimates that were made when testing the approach in a firm manufacturing and trading in industrial textiles.

## The purpose of this paper

Conventional accounting is based on the matching of cost and revenues under the Historical Cost Approach (HCA). It has been criticised on many grounds. Amongst the most persuasive of the challenges to HCA are (i) that it involves arbitrary and incorrigible allocations of the costs of fixed assets to accounting periods (see Thomas, 1969, 1974, 1975, 1977 and 1979), (ii) that it ignores the opportunity cost of interest (see Cole, 1913; Hilton, 1916; Scovell, 1919 and 1924; Schwayder 1968 and 1970; Defliese, 1973; Anthony, 1975 and 1982) and (iii) that it understates costs in inflationary environments[1]. The omission of interest adjustments could be considered to be particularly important in the UK during the last two decades, when interest rates and opportunity costs of capital have been historically high (e.g. Phillips and Drew, 1985, estimated that the average annual rate of return for UK equities in the period 1975–84 was 31.7%).

Grinyer (1985, 1987a) presented a theoretical model, called Earned Economic Income (EEI), which attempted to meet each of the criticisms (i) to (iii) above so far as accounting for fixed assets is concerned. (Gregory, 1987, subsequently and independently published an identical algorithm for cost allocation, as a development of the residual income debate.) As noted above, the rates of interest in recent years have been relatively high and may reasonably be considered to make a material impact on the cost of financing operating activities during an accounting period. In recognition of this an additional set of adjustments can be added to the accounting for fixed assets element of EEI to derive a more comprehensive system of accounting for interest. Such a system was developed and has been tested empirically (see Grinyer and Elbadri, 1987). As with all practical systems it inevitably results from the combination of deductive reasoning and pragmatic judgements which recognise sources of data and the materiality of the adjustments made.

This paper will not attempt to establish the theoretical validity of EEI, for that was the subject of Grinyer (1985 and 1987(a)). Instead it presents a case study that introduces and demonstrates the system tested in the Grinyer and Elbadri (1987) research, which was developed from the basic EEI concept. The case study illustrates both the format and content of the proposed approach and the information that it provides. Grinyer and Lyon (1989) present arguments to support the perception that matching, realised profit reporting methods are preferable to valuation based current value approaches for the evaluation of financial performance. That conclusion is adopted for the purpose of the analysis that follows, which assumes that the primary purpose of accounting reports is to monitor and motivate the financial performance of managers. It follows that the proposed EEI based system should be compared with an alternative matching, realised profit approach in order to identify its merits for the identified purposes. Such an alternative could be either HCA or Current Purchasing Power (CPP) accounting, which is derived from it. As noted below, EEI does not require explicit adjustments for inflation, so it is not obvious that it should be compared with CPP. In addition the almost universally used method for external reporting is HCA and it is the method used for internal management accounting by all eight UK and overseas firms in which the EEI based system has been tested to date. It is therefore the base from which change would occur if a new reporting approach was adopted in those companies. The choice of HCA as a comparator for EEI seems therefore to be appropriate for this study.

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[1] Other challenges are based on the fact that HCA is a realised profit, matching, approach and therefore does not recognise unrealised increments in value in figures of reported profit and in the balance sheet. As will be indicated below, these challenges are not considered to be appropriate for the primary purposes assumed for accounting reports by this paper.

[2] The EEI balance sheet figures are identical to the present value of future EEI depreciation charges.

*The authors are, respectively, professor of accountancy and business finance at the University of Dundee and lecturer in accountancy at the University of Garyounis, Libya. They thank R. Kouhy and anonymous referees for their helpful comments on the paper.

It is important for readers to appreciate that EEI has to date been proposed only for the monitoring of the financial performance of management. There have been no claims that it provides the most relevant information for the other purposes for which readers of accounts may require financial statements. The most likely position is that different accounting statements best serve different purposes. If that is the case the provision of any particular statement will ultimately depend on both perceived costs and benefits and probably on the impact of the document on vested interests. This interesting area will not, however, be pursued here. Furthermore, the analysis of the reactions of financial managers to EEI will be presented in a subsequent paper.

Appendix I provides a brief outline of the basic relationships of EEI, including the reason why it does not necessarily require adjustments for inflation so far as the results of the current accounting period are concerned. (It also refers to the problem of uncertainty and EEI calculations.) More extensive discussions and illustrations appear in Grinyer (1985 and 1987a), which also explore the EEI relationships more rigorously. The appendix is therefore presented below as a convenience for the reader. This paper is concerned exclusively with the presentation and interpretation of the case study. Firstly the company's background and HCA accounts are introduced. Secondly a modified set of statements which account for the fixed assets using EEI is presented and contrasted with HCA as a basis for understanding the meaning of the EEI fixed asset accounting figures. Finally adjustments for intra-period cash flows are added and the results of the adjustments discussed. For the reasons outlined above, the presentation concentrates on the evaluation of an alternative to the HCA profit and loss account as an indicator of management performance. Although balance sheets are prepared under the EEI approach, they do not show the values of assets, but merely past outlays (including interest costs) which have not yet been set against revenue. This feature of EEI balance sheets is shared by all other matching, realised profit, approaches.

## The company

Company C is a British subsidiary of a UK holding company operating on an international scale. It manufactures, and trades in, industrial textiles. The industry involved is highly competitive and has been contracting over the last decade. A significant part of the company's business involves exporting on terms which provide customers with extensive periods of credit. The firm has two operating departments, one of which is responsible for production and the other for trading.

Table 1 shows the company's HCA profit and loss account for the year ended 31 December 1984, analysed by departments. The related balance sheet is shown as Table 2. At the start of 1983, when the EEI exercise commenced, fixed assets were revalued in the HCA accounts at net realisable value, following the logic of Grinyer (1987b). (The revalued amounts have been used in the EEI statements also.) It follows that the figures for depreciation in Table 1 are based on current sale values at 31 December 1982. The firm used straight line depreciation; the detailed calculations are shown in Appendix II.

An examination of the HCA profit and loss account indicates that both of the divisions are producing HC profits. The transfer price for goods sold by the production department to the merchant department is set by reference to market prices and is accepted by management as being satisfactory for the purpose of the assessment of performance. Although the production department has the higher figure of profit, and the higher percentage of net profit to sales, it is not wise to assume that these figures necessarily indicate that it has performed better than the merchant department because the cost of holding the resources required to generate the profit is not shown in the profit and loss account. Earnings before tax as a percentage of net assets employed is 13.4% for the firm as a whole.

### *EEI and Fixed Assets*

Any method of depreciation under matching approaches to accounting requires the identification of (i) the cost to be spread over the periods making use of the asset involved and (ii) the estimation of the pattern of benefit by reference to which the cost is to be allocated. In practice (i) does not seem to present practical problems under HCA, if one excludes revaluation and accounting for acquisitions, but (ii) is so problematic that firms typically adopt a standard depreciation pattern (e.g. fixed instalment over ten years) and apply it consistently within the firm for a particular class of asset. Part of the reason for the apparently arbitrary practical approach to (ii) may be that it is, as demonstrated by Thomas, difficult to assign revenues to specific assets which combine with other resources to generate sales revenue. It follows that

**Table 1**
**Company C**
**Profit & loss statement for year ended 31.12.84—HC basis**

| | | *Production Department* | | *Merchant Department* | | *Total* | |
|---|---|---|---|---|---|---|---|
| | | £ | £ | £ | £ | £ | £ |
| Sales | | | 2,944,701 | | 5,621,794 | | 8,566,495 |
| Less: | Cost of goods sold | | | | | | |
| | Opening stocks | 294,611 | | 540,662 | | 835,273 | |
| | Purchases and conversion costs | 2,608,814 | | 5,532,282 | | 8,141,096 | |
| | Less: Closing stocks | 359,307 | | 983,176 | | 1,342,483 | |
| | | | 2,544,118 | | 5,089,768 | | 7,633,886 |
| | | | 400,583 | | 532,026 | | 932,609 |
| Less: | Costs | | | | | | |
| | Marketing | 64,042 | | 238,759 | | 302,801 | |
| | Production development | 21,421 | | 7,140 | | 28,561 | |
| | Administration | 95,288 | | 170,658 | | 265,946 | |
| | Depreciation (App. II) | 28,385 | | 4,625 | | 33,010 | |
| | | | 209,136 | | 421,182 | | 630,318 |
| Net Profit before tax | | | 191,447 | | 110,844 | | 302,291 |

any attempt to apportion the costs of fixed assets to accounting periods by reference to the 'revenues' generated by those assets is unlikely to succeed, so that the classic matching concept (see Paton and Littleton, 1940) typically fails in this context.

EEI requires the identification of (i) and (ii) and, in addition, the estimation of an appropriate rate of interest. The parent company of Company C had already estimated the cost of capital for the subsidiary by reference to market rates and their rate of 13% was used for the EEI calculations for 1984. It is accepted by the authors that the use of management's rate may be questionable. The estimation of an opportunity cost of capital for report-

**Table 2**
**Company C**
**HCA Balance sheet at 31 December 1984**

| | | |
|---|---|---|
| *Fixed Assets:* | | |
| Net (Appendix II) | | 250,980 |
| *Current Assets:* | | |
| Stocks | 1,342,483 | |
| Bank and cash | 104,098 | |
| Debtors and prepayments | 3,290,530 | |
| | 4,737,111 | |
| *Current Liabilities:* | | |
| Creditors | 2,729,822 | 2,007,289 |
| | | 2,258,269 |
| *Capital & Reserves* | | |
| Share capital | | 1,200,000 |
| Reserves | | 245,577 |
| | | 1,445,577 |
| Intergroup loans | 802;661 | |
| Deferred taxation | 10,031 | 812,692 |
| | | 2,258,269 |

ing purposes is a subject which merits extensive discussion, but such a discussion is best left to another paper. So far as the Company C case is concerned, however, the use of 13% was adopted by the researchers because (a) that rate was the one which the senior managers, reviewing the progress of Company C using EEI, considered to be appropriate for both divisions and wished to use as a criterion rate, and (b) an approximate recognition of important opportunity costs seems to be better than none at all. Nevertheless, it can reasonably be argued that a more refined analysis would take account of the likely differences in the risks of the two divisions.

The sale value of the fixed assets at the beginning of 1983 was accepted by senior management as equivalent to the outlay on fixed assets held at that time (see Grinyer, 1987(b) for a justification of this practice). In this case, then, the same figures of investment in fixed assets at 31 December 1982 were used in the HCA and the EEI statements. One could reasonably argue that the practical problems associated with identifying the investment outlays in EEI are essentially the same as those of obtaining that data for HCA.

EEI requires that the interest adjusted outlays on fixed assets be written off by reference to the pattern of cash flows generated by the ownership of the asset. A basis for estimating such a pattern was outlined in Grinyer, 1987(a), and was used in the case. It identifies cash inflows to fixed assets as the cash savings arising from ownership under a going concern assumption, rather than arising as a part of total sales revenue, and therefore overcomes the above mentioned problems of matching the costs of fixed assets to revenues. The financial director of Company C indicated that the business would have hired the cars it used if they were not owned, thus the alternative to ownership was hiring. The pattern of income to such assets was therefore accepted by management as being the saving of hire charges, which were known to the firm. Similar estimates were possible for other fixed assets under an agreed assumption that the firm was a going concern. The savings from owning property were the saved rental costs, obtained from a local firm of chartered surveyors which acted as an agent for commercial property. A market existed for second hand plant of the type that the firm used and the finance director estimated the current purchase costs of such plant and its useful life, which enabled annuity calculations to be made to estimate the pattern of savings made by reason of ownership. It was therefore possible to estimate the savings achieved by owning the fixed assets under the assumption that the firm would use alternative means to acquire the services required from currently owned assets in the event that it was deprived of those assets. All current savings were inflated by 5% per annum, to take account of estimated inflation of specific prices, when calculating future savings.

To find the depreciation charge under EEI one can follow the procedure:

1. Find the proportion ($A_p$) of the present value of savings from the asset which is attributable to the accounting period in question, i.e.

$$A_p = \frac{C_p(1+i)^{-p}}{\sum_{j=1}^{n} C_j(1+i)^{-j}} \qquad [1]$$

   where $C_j$ and $C_p$ are the cash savings arising in periods $j$ and $p$ respectively, the fixed asset being acquired at the start of period 0; $p$ is the accounting period; and $i$ is the relevant rate of interest, here assumed to be constant.

   It is assumed that cash flows occur at the year end.

2. The depreciation charge ($D_p$) is found:

$$D_p = A_p I(1+i)^p \qquad [2]$$

   where $I$ is the initial outlay on the fixed asset.

As shown in Appendix I and earlier literature, the EEI depreciation charge has properties relating it to NPV. In addition there are alternative ways of calculating it, e.g. the depreciation charge equals

$$C_p \frac{I}{PV}$$

where $PV$ is

$$\sum_{j=1}^{n} C_j(1+i)^{-j}$$

so $I/PV$ is the reciprocal of the present value profitability index (described in most textbooks on financial management). The calculations under assumptions of changing interest rates are easy and are illustrated in Grinyer (1985 and 1987a).

Table 3 was prepared from the estimates of cash savings outlined above, using the relationships in [1] and [2]. It shows the EEI depreciation schedule as perceived in 1984. Similar calculations made in 1983 had used an estimated cost of capital of 12%. The increase in interest rates meant that the earlier estimates of depreciation for 1983 were understated, which resulted in a prior year adjustment in the case of all fixed assets. Such adjustments would be charged or credited to the profit and loss account and reflect revisions in expectations.

The accounting entries adopted to implement EEI depreciation were similar to those advocated for the annuity method of depreciation. Indeed with a constant figure of annual savings the EEI depreciation figures and accounting entries would be identical to those of the standard annuity method. Table 4 shows the figures which would appear in the fixed asset accounts; contra entries for interest and depreciation eventually appear in

**Table 3**
**Depreciation schedule calculated in 1984, using a rate of 13% p.a.**

| *Years* | *PV of saving attributable to year* £ | *Proportion of total PV* (A) | *Depreciation for year* (D) £ |
|---|---|---|---|
| *Property* | | | |
| 1 | 21,593 | 0.094120 | 19,144 |
| 2 | 20,064 | 0.087456 | 20,101 |
| 3 | 18,644 | 0.081265 | 21,106 |
| : | | | |
| 19 | 5,758 | 0.025100 | 46,072 |
| *Machinery* | | | |
| 1 | 19,381 | 0.176155 | 19,906 |
| 2 | 18,008 | 0.163685 | 20,901 |
| 3 | 16,733 | 0.152100 | 21,946 |
| : | | | |
| 7 | 12,475 | 0.113387 | 26,675 |
| *Cars* | | | |
| 1 | 10,691 | 0.278160 | 11,630 |
| 2 | 9,868 | 0.258487 | 12,212 |
| 3 | 9,169 | 0.240177 | 12,822 |
| 4 | 8,520 | 0.223176 | 13,464 |

the profit and loss account. Note that, as with the annuity method, the total cost of the fixed asset is eventually written off, and unrealised gains are not included in the asset value on the balance sheet. Thus EEI depreciation is a realised profit approach and conforms to the requirements of EEC and UK law in that respect.

The thinking underlying the above calculations of depreciation suggests that a revised format for the profit and loss account could be helpful, by providing more relevant information for the assessment of operating performance and for the post-audit of capital expenditure. Such a format would charge operations with the cost of acquiring required services by the cheapest alternative to owning the existing assets. These charges would replace depreciation in the operating statement and form the notional income for a section in the accounts

**Table 4**
**Company C—1984**
**Fixed assets calculation—EEI basis**

| | *Property* £ | *Machinery* £ | *Cars* £ |
|---|---|---|---|
| *1983* | | | |
| Revalued at | 180,000 | 100,000 | 37,000 |
| Add: Interest at 12% | 21,600 | 12,000 | 4,440 |
| | 201,600 | 112,000 | 41,440 |
| Less: Depreciation | 17,832 | 19,257 | 11,383 |
| *1984* | 183,768 | 92,743 | 30,057 |
| Prior year adjustment -w/off | 1,312 | 649 | 247 |
| | 182,456 | 92,094 | 29,810 |
| Add: Interest at 13% | 23,719 | 11,972 | 3,875 |
| | 206,175 | 104,066 | 33,685 |
| Less: Depreciation (see Table 3) | 20,101 | 20,901 | 12,212 |
| Balance sheet value | 186,074 | 83,165 | 21,473 |

Total EEI value of Fixed Assets: 186,074 + 83,165 + 21,473 = 290,712
Total interest charge for 1984: 23,719 + 11,972 + 3,875 = 39,566
Total prior year adjustment: 1,312 + 649 + 247 = 2,208

dealing with the result of investing in fixed assets. Adopting such a format and EEI depreciation leads to a revised HCA profit and loss account, as shown in Table 5.

Comparison of Table 5 with Table 1 (the HCA Profit & Loss Account) shows that:

(a) It allows the assessment of operating activities by charging for the use of fixed assets at current price levels. Thus operating managers are not automatically given the benefit of earlier investment decisions over which they may have had little influence, nor are they systematically charged with the cost of unsuccessful investment decisions.

(b) The results from investment in fixed assets is separately reported in the revised statement using EEI depreciation. This has been done on a basis which is consistent with NPV calculations. Figures of 'gain from ownership' are the interest adjusted figures of NPV attributable to the savings by reason of the ownership of the fixed assets which have been identified in the statement (see the discussion above). They therefore have a meaning which can be interpreted by reference to a well known approach to the economic evaluation of financial prospects.

When interpreting Table 5 it is helpful to note that the figures which reflect operating performance, after recognising the opportunity cost of interest on expenditure on fixed assets, are the amounts shown as 'Net Operating Profit'. Subsequent interest credits are essentially moving the statement back towards HCA, i.e. the revised format treats interest as both a charge and as a notional receipt—much as occurs with the annuity method.

It is clear that EEI depreciation introduces a relatively sophisticated interest adjusted measure which is analogous to the well known annuity method of depreciation. It can, however, be claimed that the suggested implementation of EEI includes at least two fundamental improvements on the annuity method, which are:

1. It provides separate figures for the post-audit of capital expenditure, and in the process provides a figure of gross operating profit which is arguably more relevant than HCA for assessing current operating activity.
2. It generates figures of gains or losses on fixed assets which have unambiguous economic meanings, given the accuracy of the underlying estimates. (At the very least the thinking behind the method therefore enables a new interpretation of the meaning of 'annuity' based depreciation.)

*Intra Period Cash Flows*

It is possible to develop the statement on Table 5 further under an assumption that all cash flows during an accounting period occur on the last day of that period. This would involve adjustments to the values of all opening figures of resources, to compound them to their end year values, and could be sufficient given low rates of interest. Currently prevailing interest rates suggest, however, that such a practice is inadequate. Assuming that payments for a category of cost occur at month ends evenly over the year, then the annual understatement of the cost after recognising the opportunity cost of capital can be found as follows:

$$U = \frac{X}{12} \sum_{j=1}^{12} (1+i)^{(12-j)/12} - X \qquad [3]$$

where

$U \equiv$ understatement
$X \equiv$ the annual HCA amount
$i \equiv$ annual interest rate

If one considers a relatively modest annual interest rate of 12% and accepts the basis suggested, the annual costs will be understated by over 5% of the HCA figure shown. Such an outcome could reasonably be considered to be material. On the basis of that perception, a further development of the interest adjusted system was undertaken. This modification takes all operating HCA flows, converts them into their cash equivalent after taking account of periods of credit allowed, and then compounds them to year end values. In the case of Company C the interest calculations were based on the assumption of equal monthly flows and therefore made the adjustments implied by [3] above.

The process developed for the adjustment of operating items was as follows:

1. Adjust figures of sales and purchases on credit to their cash equivalents, by discounting them to take account of the period of credit allowed or received. The logic underlying this adjustment is that transactions on credit are a combination of the sale of goods and the provision of finance. Adjusting in this way disentangles the two elements.
2. Compound the cash equivalents, where periods of credit are involved, or the payments or receipts where no credit is involved, to end year values. Thus all figures are converted to their end of accounting period interest adjusted equivalent amounts.
3. The interest adjustments involve debits and credits to accounts for sales and costs, the contra entries being made to an interest account which is transferred to the profit and loss account as an adjustment to the figure of net operating profit (now called Net Operating EEI) in a similar way to that shown in Table 5.

**Table 5**
**Company C**
**Profit & loss statement for the year ended 31.12.84 (using EEI depreciation and format)**

| | | | *Production Department* | | *Merchant Department* | | *Total* |
|---|---|---|---|---|---|---|---|
| | | | £ | | £ | | £ |
| Sales | (see Table 1) | | 2,944,701 | | 5,621,794 | | 8,566,495 |
| Less: | Cost of goods sold (see Table 1) | | 2,544,118 | | 5,089,768 | | 7,633,886 |
| | | | 400,583 | | 532,026 | | 932,609 |
| Less: | Costs excluding depreciation | 180,751 | | 416,557 | | 597,308 | |
| | Charge for use of (see Note 1) | | | | | | |
| | Cars | 6,300 | | 6,300 | | 12,600 | |
| | Machinery | 22,995 | | — | | 22,995 | |
| | Property | 25,620 | | — | | 25,620 | |
| | | | 235,666 | | 422,857 | | 658,523 |
| *Gross operating profit* | | | 164,917 | | 109,169 | | 274,086 |
| Charges to operations | | | | | | | |
| | (i) for cars | 6,300 | | 6,300 | | 12,600 | |
| | Less: depreciation | 6,106 | | 6,106 | | 12,212 | |
| | Gain from ownership | | 194 | | 194 | | 388 |
| | (ii) for machinery | 22,995 | | — | | 22,995 | |
| | Less: depreciation | 20,001 | | — | | 20,901 | |
| | Gain from ownership | | 2,094 | | — | | 2,094 |
| | (iii) for property | 25,620 | | — | | 25,620 | |
| | Less: depreciation | 20,101 | | — | | 20,101 | |
| | Gain from ownership | | 5,519 | | — | | 5,519 |
| Net operating profit | | | 172,724 | | 109,363 | | 282,087 |
| Add: | Interest charge to fixed assets (Table 4) | | | | | | 39,566 |
| | | | | | | | 321,653 |
| Less: | Prior year adjustment (Table 4) | | | | | | 2,208 |
| Net Profit before tax (see Note 2) | | | | | | | 319,445 |

*Notes*

1. These charges are the savings from ownership identified in the text. They reflect current costs of the resources used, if they had to be acquired in current market conditions. The figures are contras to those in the subsequent section of the statement.
2. This figure is reconcilable with HCA profit as follows:

| | £ | £ |
|---|---|---|
| Net profit before tax—revised | | 319,445 |
| Add: Prior year adjustment under EEI depreciation | 2,208 | |
| Excess of EEI depreciation over HCA depreciation | 20,204 | |
| | 22,412 | |
| Less: Interest addition to fixed assets treated as income | 39,566 | |
| Net increase attributable to changed basis for accounting for fixed assets | | 17,154 |
| HCA profit—per Table 1 | | 302,291 |

As indicated above, in the case study it was assumed that all items of revenue and costs were spread evenly over the year. Appendix III shows the calculations made in respect of sales in the case. Similar adjustments would be made to all credit based transactions. Note the implementation of (1) and (2) above. Observe also that different assumptions would generate different calculations.

Appendix IV shows the calculations made in the case to derive the cost of goods sold figures. Again the figures model the stated assumptions. The elements additional to the sort of adjustments in Appendix III are the calculations for interest on opening and closing stocks. Opening stocks are converted to year end values (having previously been adjusted to their cash equivalents at the beginning of the year). It will be seen that the estimation of the year end value of the closing stocks involves adjustments for the period of credit and then for the holding period. In principle these adjustments are no different from the ones described in (1) and (2) above.

The adjustments for interest on operating costs are straightforward and follow the pattern already identified. For simplicity it was assumed in the case that those costs had all been incurred in cash, rather than on credit terms. Appendix V shows the calculations, while Appendix VI summarises the interest adjustments described above.

One could reason that it is desirable to adjust the income statement for the interest element in opening and closing debtors and creditors. In effect such figures include an element of interest that has not yet been earned, and should therefore be discounted when assessing the results of the period. Such adjustments would not be difficult to make, but were not made in the case because it was judged that the differences between opening and closing balances of amounts outstanding was insufficient to justify them.

**Table 6**
**Company C**
**Income statements for the year ended 31.12.84—EEI basis**

| | *Production Department* | | *Merchant Department* | | | *Total* |
|---|---|---|---|---|---|---|
| | £ | £ | £ | £ | £ | £ |
| Sales (App. III) | | 3,050,898 | | 5,581,730 | | 8,632,628 |
| Less: Cost of goods sold (App. IV) | | 2,680,899 | | 5,276,732 | | 7,957,631 |
| Gross operating contribution at end of year value | | 369,999 | | 304,998 | | 674,997 |
| Less: | | | | | | |
| Cost of operation (except depreciation) (App. V) | 191,512 | | 441,359 | | 632,871 | |
| Charge for use of fixed assets: | | | | | | |
| Cars | 6,300 | | 6,300 | | 12,600 | |
| Machinery | 22,995 | | — | | 22,995 | |
| Property | 25,620 | 246,427 | | 447,659 | 25,620 | 694,086 |
| Gross operating EEI | | 123,572 | | (142,661) | | (19,089) |
| Add: Net gains from owning the fixed assets (Table 5) | | | | | | |
| Cars | 194 | | 194 | | 388 | |
| Machinery | 2,094 | | — | | 2,094 | |
| Property | 5,519 | | — | | 5,519 | |
| | | 7,807 | | 194 | | 8,001 |
| Net Operating EEI | | 131,379 | | (142,467) | | (11,088) |
| Add: Net interest charge to operation (App. V) | | 68,212 | | 237,653 | | 305,865 |
| Gross surplus | | 199,591 | | 95,186 | | 294,777 |
| Less: Adjustment for prior year depreciation | | | | | | 2,208 |
| | | | | | | 292,569 |

Note: All figures are shown at their year-end equivalents after interest adjustments.

Table 6 is the result of making the additional adjustments described in this section to the figures in Table 5. It shows the control statement developed to date from the EEI concept, i.e. the EEI Income Statement. Table 7 is the associated balance sheet which, as indicated above, is not a statement of asset values but rather a listing of past interest adjusted outlays carried forward to be set against future cash inflows.

Note that (a) the impact of introducing intra-period interest adjustments is largely the provision of more relevant information for assessing operations than arises with HCA, since interest charges are eventually credited back to the profit and loss account in a manner similar to that in Table 5; (b) the additional adjustments now introduced are not dependent on the allocation logic of EEI, since they arise largely within a single accounting period or, if they do overlap accounting periods, are associated with outlays which are not themselves typically apportioned in the manner of depreciation costs; and (c) rejection of this final phase should not imply rejection of Table 5 and other possible developments from it (each element deserves to be assessed separately on its merits).

The differences between Tables 1 and 6 so far as accounting for fixed assets is concerned have already been discussed in the preceding section of this paper. Consequently this section will address only the information shown concerning the assessment of operations.

Total gross operating contribution under EEI is significantly less than under HCA. This is largely because the merchant department figure of sales includes a very extensive period of credit allowed to a number of overseas customers. The EEI calculations remove the associated interest element from sales and credit it to interest account. Appendices III and IV show that the sums involved in this adjustment were £353,725 for merchant department (equivalent to 6.3% of the annual credit sales value) and £65,246 for production department (equivalent to 2.2% of the annual credit sales value). It is clear that the removal from merchant department sales of the cost of the interest associated with credit has had a dramatic effect on the sales margin. Although the reduction in sales figures to reflect the cost of credit allowed was partially offset by the interest credit to sales to bring cash equivalents for sales to end of year values, the latter adjustment was insufficient to offset the increased figures of costs of goods sold after interest adjustments had converted them to end of year values. Merchant department therefore shows a substantially reduced EEI gross operating contribution compared with the HCA gross profit. Production department's gross contribution has also been affected in a similar manner, but to a much smaller extent because the period of credit allowed to customers is very much less in that department. Gross operating contributions as percentages of sales values on the revised statement are about 12% for production department and 5% for merchant department, compared with 13% and 9% respectively under HCA. It is clear that the interest adjustments have highlighted a fundamental difference in performance related to the different positions concerning the granting of credit in the two departments.

**Table 7**
**Company C: EEI Balance sheet at 31 December 1984**

| | £ | £ |
|---|---|---|
| *Fixed Assets:* | | |
| Net (Table 4) | | 290,712 |
| *Current Assets:* | | |
| Stocks (Appendix IV) | 1,302,087 | |
| Bank and cash (Table 2) | 104,098 | |
| Debtors and prepayments (Table 2) | 3,290,530 | |
| | 4,696,715 | |
| *Current Liabilities:* | | |
| Creditors (Table 2) | 2,729,822 | 1,966,893 |
| | | 2,257,605 |
| *Capital and Reserves* | | |
| Share capital (Table 2) | | 1,200,000 |
| Reserves | | 244,913 |
| | | 1,444,913 |
| Intergroup loans (Table 2) | 802,661 | |
| Deferred taxation (Table 2) | 10,031 | 812,692 |
| | | 2,257,605 |

After deducting the interest adjusted costs of operation, the revised statement shows that production department made a positive gross operating profit and therefore covered all costs, including the opportunity costs of capital. In contrast, merchant department shows a sizeable operating loss indicating that it has not covered all of its costs. Indeed the loss for merchant department is sufficient to create an overall gross operating EEI loss for the firm as a whole. Note that, given the interest adjustments, a figure of zero operating EEI represents satisfactory performance if the estimates underlying the calculations are correct. Table 1 shows HCA net profits of £191,447 and £110,844 respectively for production and merchant departments, which makes merchanting look reasonable and indicates an apparently satisfactory outcome for the total firm. Obviously these figures do not include any criteria of required profit. Presumably the assessment of the adequacy of the HCA profits will require the use of a crude benchmark such as a figure of a required rate of return on capital employed. It can reasonably be claimed that the EEI format provides a more informative analysis of the results from current operations.

Addition of the EEI gains from owning fixed assets leads to the figure of net operating EEI, which includes gains or losses made by reason of the investment in fixed assets within the divisions. To the extent that the opportunity to invest in such assets is dependent on the ongoing operations of the division, it can be argued that the results from gross operating EEI should not be finally assessed without reference to the net EEI figure. Obviously HCA figures automatically incorporate the results of investing in fixed assets within the figure of net profit—but a comparison of net operating EEI and HCA net profit does not alter the general conclusions reached above—on the whole the investment in fixed assets has broken even but has generated relatively little surplus. One could argue that the figures of gross and net operating EEI are the ones to use to judge the financial performance of the divisions and of the firm, for they systematically incorporate the cost of capital criterion relevant to such an assessment.

Subsequent sections of the revised report add back the net total of interest adjustments (including interest charges to operations) in a manner similar to that adopted under the annuity approach, except that under EEI the entry is separated from the part of the accounts showing operating performance. The resulting figures of gross surplus move some way towards HCA net profit and Table 8 reconciles the two figures. A prior year adjustment, discussed under the preceding section, then completes the statement before arriving at a final figure of net surplus to be credited to reserves.

In the case of Company C the differences between the final figures of net profit and of EEI gross surplus have been reduced because of the relatively low value of fixed assets employed in the firm. Nevertheless Table 6 highlights that the revised EEI statement can give some significant insights which are not available from unadjusted HCA.

The EEI Balance Sheet in Table 7 has already been discussed in passing. It is clearly not a statement of asset values and must be seen as an indication of the outlays on the past deployment of financial resources which are expected to generate future flows of savings.

**Table 8**
**Company C—1984**
**Reconciliation of EEI and HC net income figures**

| | | £ |
|---|---|---|
| HCA net profit (Table 1) | | 302,291 |
| Add: | Difference in opening stock values because of interest adjustments (24 + 13,496) | 13,520 |
| | | 315,811 |
| Less: | Difference in closing stock values because of interest adjustments (10,786 + 29,610) | 40,396 |
| | | 275,415 |
| Less: | Difference in depreciation | 20,204 |
| | | 255,211 |
| Add: | Interest charge to fixed assets under EEI method | 39,566 |
| Gross surplus per EEI statement | | 294,777 |

## Overview

Company C is only one of eight UK and overseas companies in which the approach shown has been tested. In all cases it was found that the applied EEI system illustrated was implementable by the researchers in a way that was accepted by the respondent firms' managers as reflecting fairly the results for their firms. The managers' assessments of the system must be the subject of a subsequent publication. At present the authors can reasonably claim that the practical system is implementable and provides additional information with economic significance. Whether that infor mation has a sufficient value to justify the modest additional costs of statement preparation but more substantial costs of additional training of the preparers and users of the accounting statements must ultimately be a matter for practical judgement.

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## Appendix I

The basic EEI algorithm can be outlined, under simplifying assumptions, by the following arguments:

(a) The *ex post* success or failure of a single investment can be found by reference to the sign and size of its NPV, calculated as:

$$NPV = \sum_{t=1}^{n} C_t(1+i)^{-t} - I_0 \qquad [I/1]$$

where

$C_t$ represents the 'certain' cash inflow which occurs at the end of period $t$;

$i$ is a constant required rate of interest, representing opportunity cost;

$I_0$ is the investment at time 0; and

$n$ is the project's time horizon, i.e. the last period in which cash flows will arise in respect of the project.

(b) As shown in equations I/2 and I/3 below, NPV can be allocated to accounting periods in proportion to their contribution to the total figure of the present value of cash inflows used in calculating the figure of NPV. Assuming that contributions are indicated by the size and timing of the cash inflows, one could then establish the proportion appropriate to period 'p' as:

$$\frac{C_p(1+i)^{-p}}{PV} \qquad [I/2]$$

where

$$PV = \sum_{t=1}^{n} C_t(1+i)^{-t}$$

The value of the realised NPV created in period p, expressed in values at the end of that period, is defined as $EEI_p$ and would therefore be:

$$EEI_p = NPV \frac{C_p(1+i)^{-p}}{PV}(1+i)^p$$

$$= C_p\left(1 - \frac{I_0}{PV}\right) \qquad [I/3]$$

(Equation I/3 can also be derived by an analysis that uses the NTV concept.)

(c) Since $I_0/PV$ is the reciprocal of the $NPV$ 'profitability index', it follows that the sign of $EEI_p$ is the same as that of $NPV$, provided that all $C_p$ are positive (see Grinyer 1987a for a justification of such an assumption). It will also be seen that $C_p I_0/PV$, which can be called 'depreciation', is a constant proportion of cash inflows $C_t$ for each period. Furthermore, provided that both cash flows $C_t$ and interest rates are expressed consistently in either money or in real terms, the EEI figures derived from the calculations will be the same whether made on a monetary or a real basis (see Wilkes 1972, Grinyer 1974, Grinyer 1985 and most recent textbooks on financial management). Thus, given correct identification of the relevant cash flows and the assumptions stated, EEI provides an *ex post* measure of the success of investment in fixed assets which has a defined economic meaning interpretable by reference to a widely used and understood decision concept.

One can introduce uncertainty by replacing the 'certain' variables in I/I by expected values. This development affects EEI depreciation on fixed assets, because forecasts of future cost savings and interest rates are required under EEI. However, as the approach allocates interest adjusted expenditure on fixed assets by reference to the expected *pattern* of benefits to be derived from owning them, it uses forecasts in a similar way to that advocated for determining depreciation under conventional *ex post* HCA. One could therefore justifiably claim that the only area in which EEI is more subjective than HCA is in the use of interest rates. Furthermore, if the future cash flows attributable to owning an asset are likely to be affected by inflation and the interest rates representing opportunity costs are also likely to be affected by inflation, the errors in estimation of future cash flows and future interest rates will to some extent compensate each other. As indicated in the paper, for the purposes of this analysis the appropriate comparison for evaluating EEI is HCA. As SSAP12 requires that HCA depreciation should be modified given changes in expectations, it clearly acknowledges that the forecasting of future benefits under uncertainty has a fundamental role in such calculations. Even so, one can justifiably claim that the latter are incorrigible and therefore have no clear economic significance (see Thomas 1969, 1974, 1975, 1977 and 1979). In that event some error of estimation in EEI figures seems to be a price worth paying, for meaningful but approximate figures seem to be vastly preferable to meaningless but precise ones! A detailed consideration of the impact of uncertainty on calculations of depreciation under EEI requires a separate paper, so the topic is not developed further here.

**Appendix II**
**Company C—1984**
**Values of Fixed Assets—HC Basis**

| | *Cars* | *Machinery* | *Property* |
|---|---|---|---|
| Revalued at beginning of 1983 | £37,000 | £100,000 | £180,000 |
| Expected useful life (years) | 4 | 7 | 19 |
| Annual fixed instalment depreciation | £9,250 | £14,286 | £9,474 |
| Depreciation for 1983 and 1984 | £18,500 | £28,572 | £18,948 |
| Written down value at end of 1984 | £18,500 | £71,428 | £161,052 |

Net value of fixed assets at end of 1984:
£18,500 + £71,428 + £161,052 = £250,980

**Allocation of HC Depreciation**

| *Assets* | *Production Dept*<br>£ | *Merchant Dept*<br>£ | *Total*<br>£ |
|---|---|---|---|
| Cars | 4,625 | 4,625 | 9,250 |
| Machinery | 14,286 | — | 14,286 |
| Property | 9,474 | — | 9,474 |
| | 28,385 | 4,625 | 33,010 |

**Appendix III**
**Company C: Sales—1984**
**Production Department**

| | £ |
|---|---|
| Sales at historical cost | 2,944,701 |
| Less: Credit element (see Note (iv))<br>$2{,}944{,}701 \times \{1 - [1 + (0.1743 \times 0.13)]^{-1}\} =$ | 65,246 |
| Cash value of sales | 2,879,455 |
| Add: Interest credit on cash value of receipt<br>$2{,}879{,}455 \times 0.13 \times 0.458$ (see Note (v)) | 171,443 |
| End year value of sales (interest adjusted) | 3,050,898 |

*Notes*

(i) It is assumed that sales are evenly spread over the months of the year.

(ii) The cost of capital was estimated at 13% in 1984.

(iii) Period for credit allowed is calculated from opening and closing HCA debtors as follows:

$$\frac{474{,}651 + 552{,}131}{2{,}944{,}701 \times 2} = 0.1743 \text{ of a year.}$$

(iv) The formula for the credit element is found as follows:
Let
$C \equiv$ price including credit
$P \equiv$ price before credit
$M \equiv$ the cost of credit, being interest rate × period of credit

*continued*

$A \equiv$ amount paid for credit
then

$$C = P(1 + M)$$
$$A = C - P = C - C(1 + M)^{-1}$$
$$= C(1 - (1 + M)^{-1})$$

(v) it is assumed that sales occur at the end of each month. Cash received at the end of the first month will earn 11/12 of a year's interest; cash received at the end of the second month 10/12 of a year's interest. The sum of the monthly figures is 0.458.

**Company C: Sales—1984**
**Merchant Department**

| | £ |
|---|---|
| Sales at historical cost | 5,621,794 |
| Less: credit element (Notes iii and iv) $5{,}621{,}794 \times \{1 - [1 + (0.5165 \times 0.13)]^{-1}\} =$ | 353,725 |
| Cash value of sales | 5,268,069 |
| Add: Interest credit on cash value of receipt $5{,}268{,}069 \times 0.13 \times 0.458$ (Note iv) = | 313,661 |
| End year value of sales interest adjusted | 5,581,730 |

*Notes*

(i) It is assumed that sales are evenly spread over the months of the year.
(ii) The cost of capital was estimated at 13% in 1984.
(iii) The period of credit allowed is calculated from opening and closing HCA debtors as follows:

$$\frac{3{,}124{,}862 + 2{,}681{,}981}{5{,}621{,}794 \times 2} = 0.5165 \text{ of a year}$$

(iv) See Notes (iv) and (v) for Production Department above.

**Appendix IV**
**Company C: Cost of Goods Sold—1984**
**Production Department**

| | | £ | £ |
|---|---|---|---|
| *Opening Stocks* | | | |
| EEI balance from 1983 | | 294,587 | |
| Add: | Interest adjustment (to convert to end of year values) $294{,}587 \times 0.13$ | 38,296 | 332,883 |
| Add: | *Purchases* | | |
| | HC | 1,448,714 | |
| | Less: Credit element $1{,}448{,}714 \times \{1 - [1 + (0.13 \times 0.3544)]^{-1}\} =$ | 63,806 | |
| | | 1,384,908 | |
| | Add: Interest adjustment $1{,}384{,}908 \times 0.13 \times 0.458$ | 82,457 | 1,467,365 |
| Direct Labour: | | | |
| | HC | 1,160,100 | |
| Add: | Interest adjustment $1{,}160{,}100 \times 0.13 \times 0.458$ | 69,072 | 1,229,172 |
| | | | 3,029,420 |
| Less: | *Closing Stocks* | | |
| | HC | 359,307 | |
| | Less: credit element $359{,}307 \times \{1 - [1 + (0.13 \times 0.3544)]^{-1}\} =$ | 15,825 | |
| | | 343,482 | |
| | $343{,}482 \times 0.13 \times 0.2257/2 =$ | 5,039 | 348,521 |
| Cost of goods sold end of year value | | | 2,680,899 |

*Notes*

(i) It is assumed that purchases are evenly spread over the months of the year.
(ii) The rate of interest was estimated at 13%.

*continued*

*continued*

(iii) The average holding period was calculated as follows:

$$\frac{294{,}587 + 359{,}307}{1{,}448{,}714 \times 2} = 0.2257 \text{ of a year}$$

The HCA stocks held at the year end would then, on average, have been in stock for half of that period. It is assumed that closing stocks are of purchased goods and components.

(iv) The period of credit received was found as follows:

$$\frac{474{,}651 + 552{,}131}{1{,}448{,}714 \times 2} = 0.3544 \text{ of a year}$$

(v) See Notes (iv) and (v) of Production Department in Appendix III.

**Company C: Cost of Goods Sold—1984**
**Merchant Department**

| | | £ | £ |
|---|---|---|---|
| *Opening Stocks* | | | |
| EEI balance from 1983 | | 527,166 | |
| Add: | Interest adjustment (to convert to end of year values) 527,166 × 0.13 = | 68,532 | 595,698 |
| Add: | *Purchases* | | |
| | HC | 5,532,282 | |
| | Less: Credit element $5{,}532{,}282 \times \{1 - [1 + (0.13 \times 0.31)]^{-1}\} =$ | 214,314 | |
| | | 5,317,968 | |
| Add: | Interest adjustment $5{,}317{,}968 \times 0.13 \times 0.458$ | 316,632 | 5,634,600 |
| | | | 6,230,298 |
| Less: | *Closing Stocks* | | |
| | HC | 983,176 | |
| | Less: Credit element $983{,}176 \times \{1 - [1 + (0.13 \times 0.31)]^{-1}\} =$ | 38,087 | |
| | | 945,089 | |
| | Add: Interest adjustment $945{,}089 \times 0.13 \times 0.138/2 =$ | 8,477 | 953,566 |
| Cost of goods sold end of year value | | | 5,276,732 |

*Notes*

(i) It is assumed that purchases are evenly spread over the months of the year.

(ii) The rate of interest was 13% per annum.

(iii) The average holding period was:

$$\frac{540{,}662 + 983{,}176}{5{,}532{,}282 \times 2} = 0.138 \text{ of a year}$$

(iv) The period of credit received was:

$$\frac{1{,}383{,}088 + 2{,}045{,}854}{5{,}532{,}282 \times 2} = 0.31 \text{ of a year}$$

(v) See Notes (iv) and (v) of Production Department in Appendix III.

**Appendix V**
**Company C: General Overheads—1984**

| | *Production Dept* | | *Merchant Dept* | | *Total* | |
|---|---|---|---|---|---|---|
| | £ | £ | £ | £ | £ | £ |
| Marketing expenses | 64,042 | | 238,759 | | 302,801 | |
| Interest adjustment | 3,813 | 67,855 | 14,216 | 252,975 | 18,029 | 320,830 |
| Production Development | 21,421 | | 7,140 | | 28,561 | |
| Interest adjustment | 1,275 | 22,696 | 425 | 7,565 | 1,700 | 30,261 |
| Administration expenses | 95,288 | | 170,658 | | 265,946 | |
| Interest adjustment | 5,673 | 100,961 | 10,161 | 180,819 | 15,834 | 281,780 |
| | | 191,512 | | 441,359 | | 632,871 |

*continued*

*Notes*

(i) It is assumed that expenses were paid in cash and were evenly spread over the months of the year.
(ii) The interest was 13%.
(iii) The cash outflows were adjusted to year end values on the basis shown in note (v) in Appendix III (Production Department).

**Company C: Interest Elements—1984**
**Net Interest Charges from Internal Operations**

| | *Production Dept* | | *Merchant Dept* | | *Total* | |
|---|---|---|---|---|---|---|
| | £ | £ | £ | £ | £ | £ |
| Interest credit to sales | (171,443) | | (313,661) | | (485,104) | |
| Less: Disallowed credit element on sales | 65,246 | (106,197) | 353,725 | 40,064 | 418,971 | (66,133) |
| *Interest Charges* | | | | | | |
| Relief for credit element in purchases | (63,806) | | (214,315) | | (278,121) | |
| Interest charged on: | | | | | | |
| Purchases | 82,457 | | 316,632 | | 399,089 | |
| Direct labour | 69,072 | | — | | 69,072 | |
| Opening stocks | 38,296 | 126,019 | 68,532 | 170,849 | 106,828 | 296,868 |
| Interest charged to expenses: | | | | | | |
| Marketing | 3,813 | | 14,216 | | 18,029 | |
| Production Dept | 1,275 | | 425 | | 1,700 | |
| Administrative | 5,673 | 10,761 | 10,161 | 24,802 | 15,834 | 35,563 |
| Interest charged to fixed assets: | | | | | | |
| Cars | 1,938 | | 1,938 | | 3,876 | |
| Machinery | 11,972 | | — | | 11,972 | |
| Property | 23,719 | 37,629 | — | 1,938 | 23,719 | 39,567 |
| Net interest charges | | 68,212 | | 237,653 | | 305,865 |

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# Corporate Social Reporting: A Rebuttal of Legitimacy Theory*

**James Guthrie and Lee D. Parker**

**Abstract**—Various rationales have been advanced to explain the phenomenon of corporate social reporting. Among these has been legitimacy theory which posits that corporate disclosures are made as reactions to environmental factors and in order to legitimise corporate actions. This paper reports the results of an historical analysis of social disclosures in 100 years of annual reporting by a dominant corporation in the Australian mining/manufacturing industry. A variable but significant pattern of social reporting is identified and compared with an earlier study of social reporting by US Steel. The results of this study fail to confirm legitimacy theory as the primary explanation for social reporting in the Australian case.

Over the last decade, accounting researchers have turned their attention to the nature of accounting as a social phenomenon (Burchell *et al.*, 1980; Tinker *et al.*, 1982). There have been calls for further research into the questions of social factors influencing the historical development of contemporary accounting practices and the social consequences that these have produced (Hopwood, 1980; Burchell *et al.*, 1985). At the same time an array of surveys of corporate social reporting (CSR)[1] in contemporary annual reports have been undertaken (Ernst and Ernst, 1979; Trotman, 1979; Guthrie and Mathews, 1985; Cowen, Ferreri and Parker, 1987; Guthrie and Parker, 1989). These surveys have mostly presumed that CSR is a purely contemporary phenomenon. For example, Parker's (1986) review of the development of social accounting literature concentrates on the post-1970 period, arguing that social accounting was very much a child of that period.

There are, however, some isolated examples of research that suggest that CSR has a history of development stretching back over many decades. Lewis *et al.* (1984) revealed the existence of a body of literature (and practical tradition) concerning corporate financial reporting to employees dating back to at least 1919. Similarly, Hogner's (1982) study of US Steel's reports over eight decades highlights a long and rich history of CSR. Hogner attributes his findings to US Steel's need to legitimise itself and its activities.

In examining the history of CSR by an Australian organisation similar to US Steel, this study has two key objectives: first, to determine whether a similar history of CSR is apparent in the Australian steel industry; and, second, to discover whether the pursuit of corporate legitimacy appears to have been a primary rationale for disclosures.

## Social reporting at US Steel

Hogner (1982) examined annual reports of US Steel for the years 1901 to 1980 and documented CSR in terms of general comment, statistical record, statistical yearly comparison and nature of activity. The data was then analysed for year to year variation over the eight decades studied.

The study found that what US Steel regarded as reportable corporate social activity varied over time. While particular social activities might be ongoing, inclusion in the annual report was observed to be selective—appearing in some years of activity but not appearing for other years of activity. The subjects of disclosure were concentrated upon the areas of human resources and community involvement. Some environmental disclosures appeared post-1960. In addition, Hogner found that not all reported information was in the form of 'good news'.[2] Some disclosures represented 'bad news'[3] about US Steel social activities, even when considered from the viewpoint of the social norms and expectations of the period. On the other hand, little effort was expended by US Steel in appraising its own reported social performance.

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*The authors are, respectively, lecturer in accounting in the School of Accountancy, University of New South Wales and professor of accounting and finance at the Flinders University of South Australia. They are grateful for advice and comments provided by Cheryl Lehman (Hofstra University), Peter Booth (University of New South Wales), Jill McKinnon and Graeme Harrison (Macquarie University), Barbara Merino (University of North Texas) and Bob Parker (Exeter University).

[1] Corporate social reporting (CSR) can be defined as a corporation's reporting on: (a) the social impacts of its activities; (b) the effectiveness of its social programs; (c) the discharging of its social responsibilities; (d) the stewardship of its own social resources. It has also been variously termed 'corporate social accounting', 'social responsibility accounting', and 'social disclosure' (Parker, 1986).

[2] 'Good news' refers to reports about corporate activities having a positive, beneficial impact on society.

[3] 'Bad news' refers to reports about activities having a negative, deleterious impact on society or failures in attempts to overcome social problems.

Two major conclusions emerge from Hogner's research. First, US Steel annual reports provide evidence of a rich and extended history of CSR, but with disclosure frequency, particularly with respect to specific information types, fluctuating over time. Thus Hogner (1982, p. 248) concludes that 'corporate social reporting is an old idea with a practical base'. Second, he frames his observations of US Steel's CSR in terms of legitimacy theory, arguing that social disclosures constituted a response to societal forces and behaviours. Thus he hypothesised that such disclosures were both motivated by and indicative of corporate needs for legitimacy.

## Legitimacy theory reviewed

Legitimacy theory posits that corporate disclosure reacts to environmental factors (economic, social, political) and that disclosures legitimise actions (Preston and Post, 1975; Hogner, 1982; Lehman, 1983; Lindblom, 1983). This theory is based upon the notion that business operates in society via a social contract where it agrees to perform various socially desired actions in return for approval of its objectives, other rewards and its ultimate survival. It therefore needs to disclosure enough social information for society to assess whether it is a good corporate citizen. In legitimising its actions via disclosure, the corporation hopes ultimately to justify its continued existence (Lehman, 1983).

This theory is largely reactive in that it suggests that organisations aim to produce congruence between the social values inherent (or implied) in their activities and societal norms (Lindblom, 1983). Corporate social disclosures may then be conceived as reacting to the environment where they are employed to legitimise corporate actions.

## Researching BHP corporate social reporting

This study presents an historical appraisal of social disclosure made by one of Australia's largest corporations, Broken Hill Proprietary Company Ltd. (BHP), a company engaged in the steel industry. BHP has been a dominant industrial corporation in the mining/manufacturing industry in Australia since its incorporation in 1885, and has a long recorded history which reflects its major impact on Australian social and economic life (Hughes, 1964; Blainey, 1968; Trengove, 1975). It has been, and continues to be, one of Australia's largest companies engaged in steel production, oil exploration and mining. The study uses an historical and content method approach to the collection, description and analysis of results associated with the social information published by BHP in its reports to shareholders for the past 100 years (from 1885 onwards). The total number of annual and half-yearly reports examined was 177.[4]

While BHP may have made CSR disclosures through the press from time to time, this study focuses on BHP's disclosures through the annual report to shareholders for two reasons. First, it can be argued that the annual report is the one communication medium to outside parties over which corporate management has complete editorial control. It is therefore not subject to the risk of journalistic interpretations and distortions possible through press reporting. Second, the focus on annual reports permits comparison of results with those of Hogner's (1982) study which also focussed on annual reports to shareholders.

Guthrie's (1983) content analysis interrogation instrument was employed to record CSR across six main themes—environment, energy, human resources, products, community involvement and others. To measure the extent of CSR, the approach of page measurement was adopted rather than a specific number count of textual characters (Neimark, 1983). For each report examined, CSR was measured to fit within a quarter page dissection of an A4 page. The amount of CSR did not include photographs and graphics. The measurement was rounded to the next quarter page amount so that CSR within 0.01 to 0.25 of a page would be recorded as 0.25. Because of this method of page measurement, the amount of CSR is not intended to be exact but to provide an indication of the trend within reasonable bounds. Page space devoted to CSR was also measured in absolute terms in order to focus the analysis upon the amount of social information disclosed rather than the emphasis placed on social disclosure in relation to all other information types disclosed (as a relational measure such as percent of corporate report length would indicate).

Reliability tests were employed in developing the interrogation instrument (Guthrie, 1983) and a single researcher was employed to code all data from BHP's annual reports. Observational categories were derived from those employed in earlier descriptive surveys.[5] To preserve internal validity, one researcher identified key themes from the history of the Australian economy while the second researcher selected and collated data from BHP annual reports. Each operated independently until completed data sets were compared.

## BHP results

The frequency of CSR was illustrated graphically by scatterplots. Figure 1 charts the total sum

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[4] BHP's corporate reports were issued six monthly till 1918 and then yearly to 1985 (the last period examined for this study).

[5] Referenced at the beginning of this paper.

**Table 1**
**Incidence of Social Disclosure by Theme**

| *Theme* | *No. of reports appeared in* | *Incidence by space measurement unit (quarter of a page)* |
|---|---|---|
| Environment | 8 | 10.0 |
| Energy | 13 | 12.5 |
| Human resources | 105 | 275.0 |
| Products | 0 | 0.0 |
| Community involvement | 86 | 80.0 |
| Others | 0 | 0.0 |
| Total incidence of disclosure | 212 | 377.5 |

of CSR disclosure, revealing a history of growth, decline, and change in CSR rather than just a short period of growth and development. Figures 2 through 5 illustrate the disclosure frequency of each theme (by page amount) over time. Table 1 presents a summary view of thematic disclosure. It is evident from these figures that there has been a waxing and waning of social disclosure over the

**Figure 1**
**Total CSRD Disclosed**

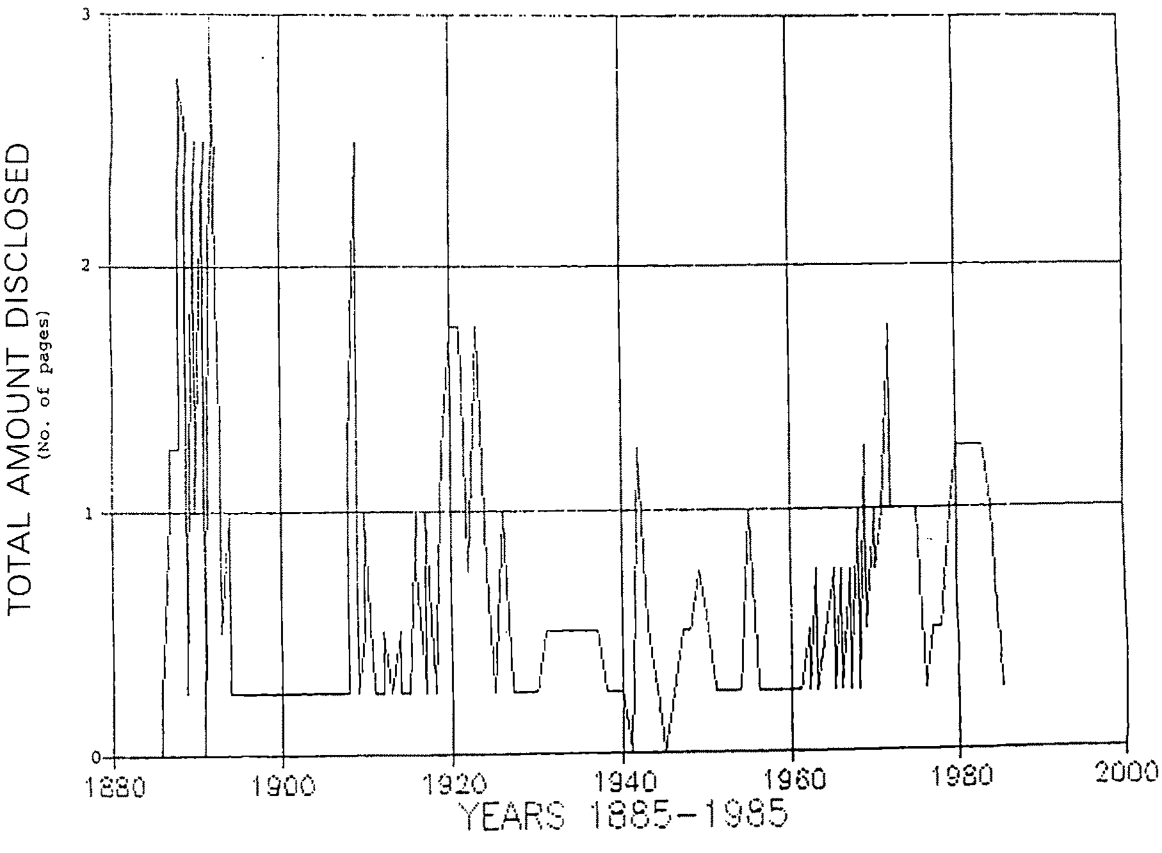
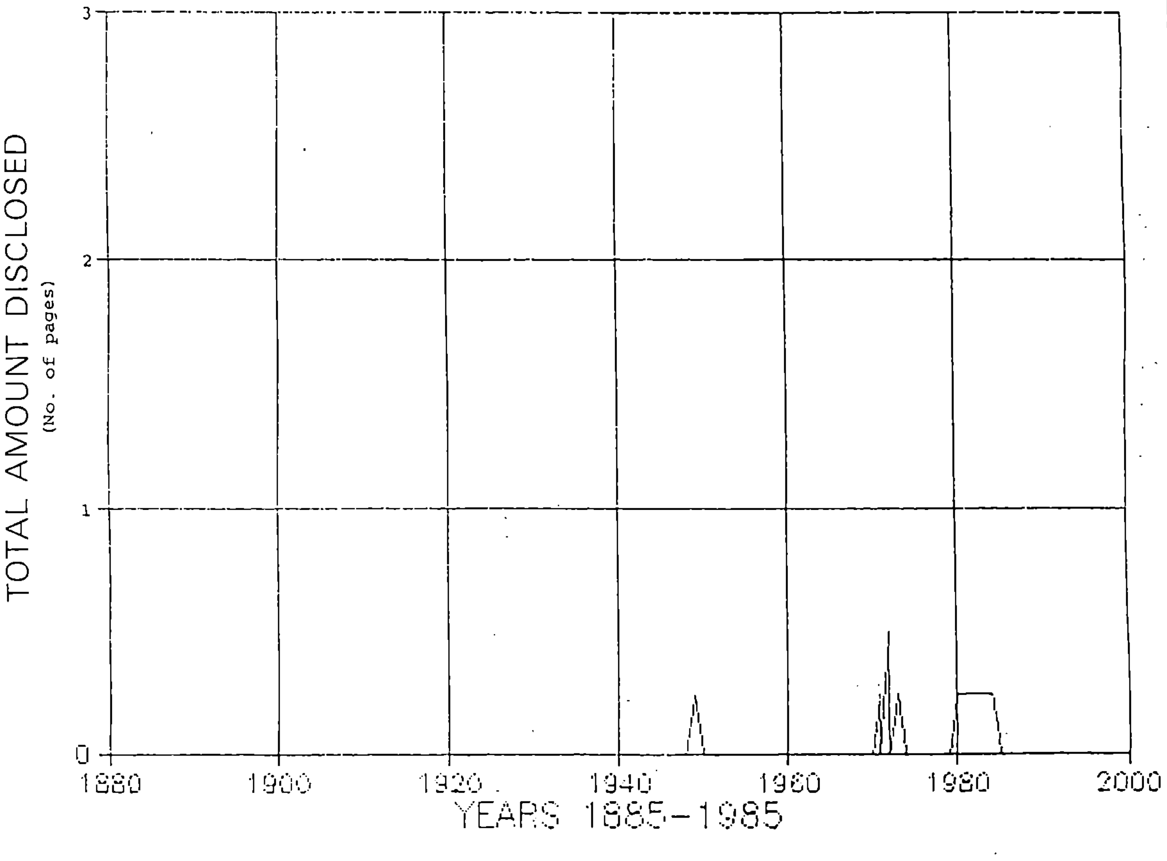


**Figure 2**
**Environmental Disclosure**



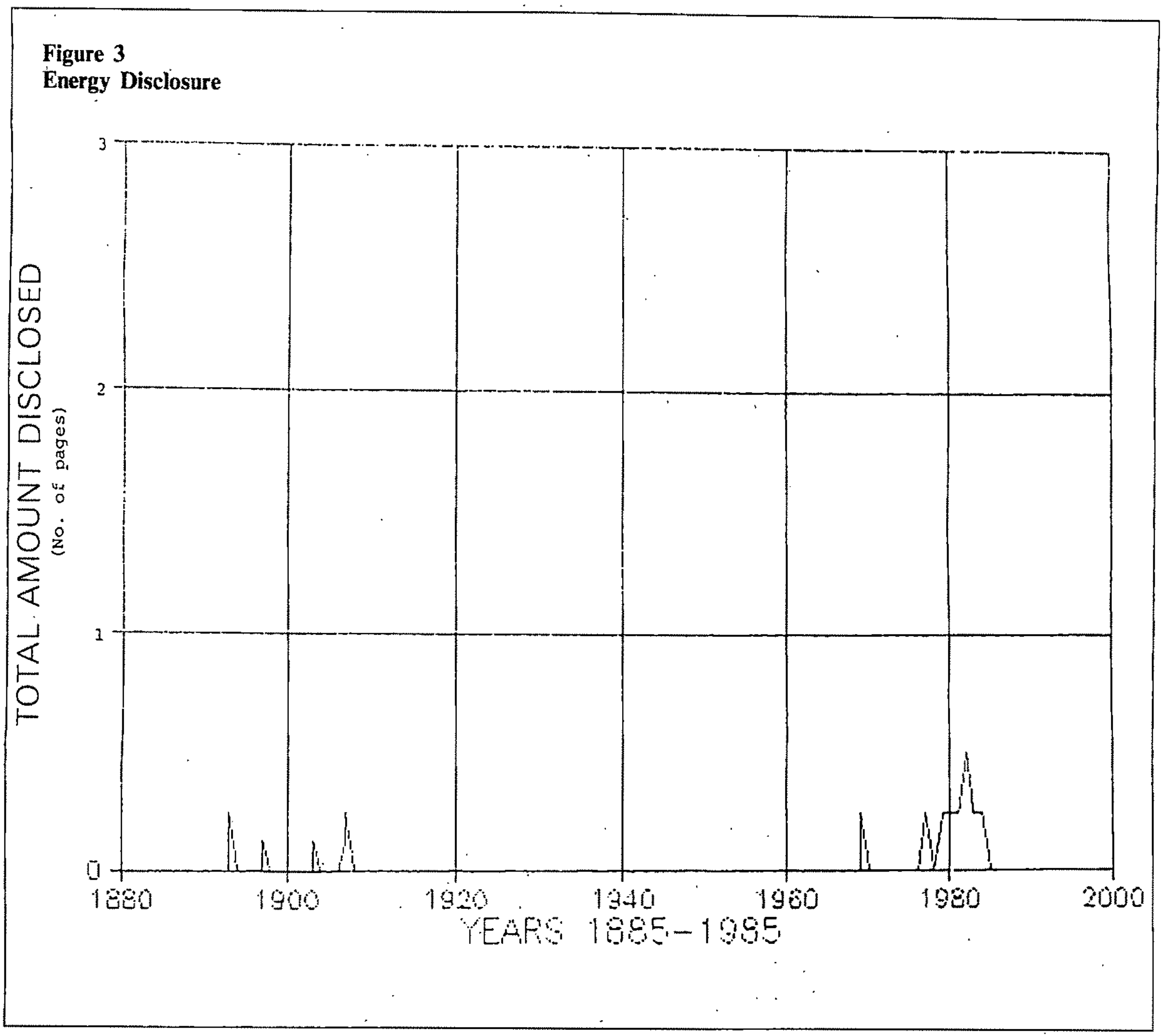
century of BHP reporting. Different themes have been in focus (e.g. human resources) from time to time, whilst others have not appeared at all (e.g. products).

Figure 1 shows that total disclosure over the period studied varied greatly. Pronounced peaks occurred around 1890, 1910 and in the early 1920s, 1940s, 1970s and 1980s. Disclosure levels appear to have been variable, with intervals between peaks ranging from 10 to 30 years. As Figure 2 reveals, environmental disclosure was totally absent until around 1950. It recurred in the early 1970s and 1980s but has remained at a relatively low level. The pattern of energy-related disclosures (Fig. 3) is noticeably different. The bulk of disclosures (albeit at similarly low levels) occurred in the periods 1890-1910 and 1970-mid 1980s. Between those periods, no disclosures were made at all.

Figure 4 reveals human resource disclosures to have been BHP's primary form of CSR, although quite inconsistent over time. Peaks of disclosure occurred around 1890, 1910, the early 1920s and around 1970. Disclosures between the early 1920s and the 1970s were at much lower levels, and indeed an examination of disclosure peaks reveals a declining overall pattern of human resource disclosure during the period under study. Finally, Figure 5 reveals the pattern of community involvement disclosure to have been different again to all the rest. Virtually no peaks and troughs are evident (with the exception of the early 1940s). A consistent (though low) level of disclosure occurred in the 1890–mid 1930s period. No disclosures were made in the mid 1940s–1970 period, with disclosures reappearing around 1980.

What can be said about these longitudinal disclosure patterns overall? Total disclosure as represented in Fig. 1 was driven primarily by BHP's focus upon human resource disclosures as shown in Figure 4. Disclosures of energy, environment and community-related matters occurred at much lower frequency levels. Even with respect to human resources, the disclosure pattern was highly variable and in the other three categories significant gaps (i.e. nil disclosure) occurred. Such gaps ranged between 20 and 60 years.

**Figure 3**
**Energy Disclosure**



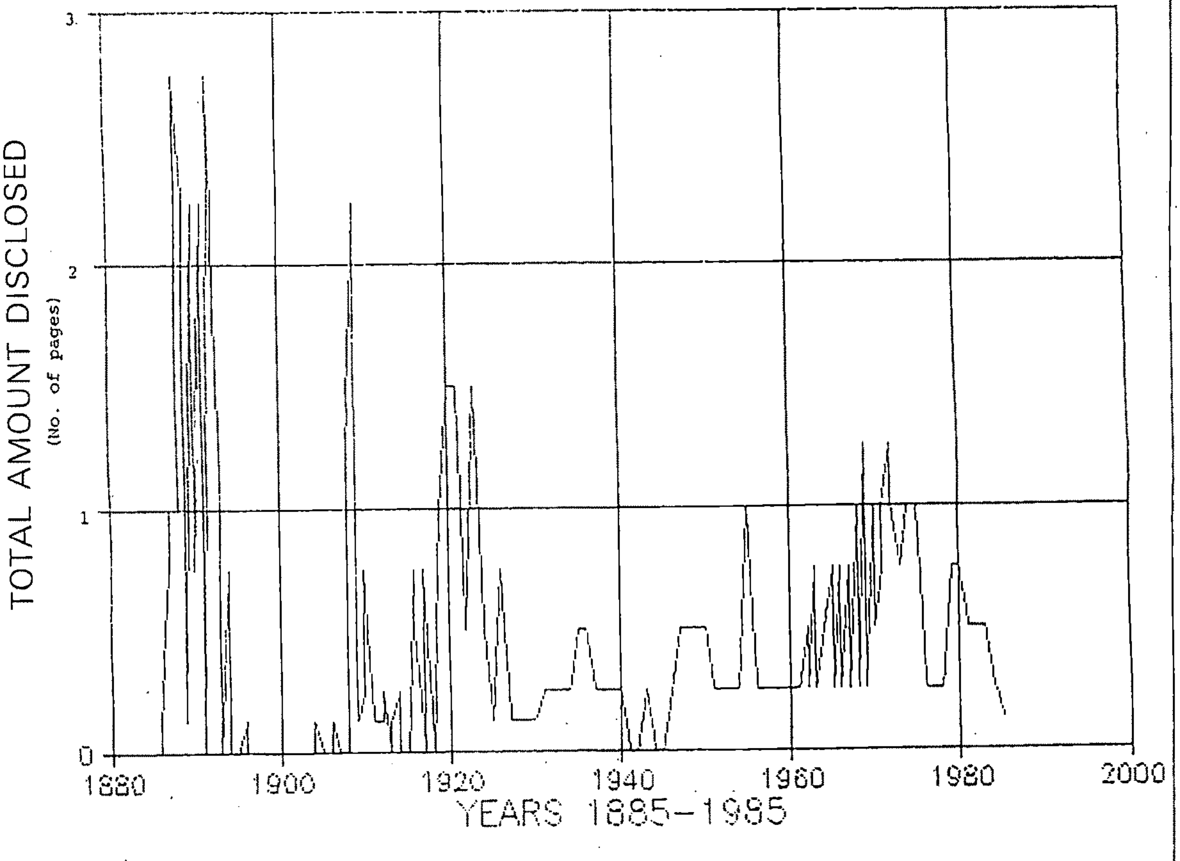
## Comparing US Steel and BHP

The analysis of BHP's historical CSR practices produce similar observations to those concerning US Steel. Both corporations have an extended history of social disclosure but with disclosure frequency, particularly with respect to specific information types, fluctuating over time. While both reported social information over a long period of time, neither made any significant attempt at appraising their reported performance in social impact terms. Both corporations concentrated their disclosure efforts on the same disclosure categories—human resources and community involvement. More recently (post 1960), both have also included environmental issues in their scope of CSR. Historically, both corporations have made 'bad news' disclosures from time to time. US Steel for instance reported reductions in mortgage assistance to employees and racially segregated housing construction for employees. BHP reported on strikes and other industrial problems.

## Examining legitimacy theory applicability

To assess the applicability of this theory to CSR, a data bank of all major events and issues relating to BHP (and their timing) was assembled from the following: Aungles and Szelenyi (1979); BHP (1960); Blainey (1968); Davidson and Stewardson (1979); Hughes (1964); Kennedy (1980); McLennan (1974); Sheridan (1981, 1982); Wills (1963); and Woodward (1952). The longitudinal BHP disclosure frequency graphs were then related to significant concurrent events which occurred in the history of BHP and its immediate environment. For each major category of disclosure (environment, energy, human resources and community involvement), the timing of observed peaks of disclosure was compared with any apparently related BHP activities or socio-economic environmental conditions occurring immediately before or during peak periods. A majority of peak disclosures associated with relevant events is considered evidence of a legitimising explanation for BHP

**Figure 4**
**Employee Disclosure**



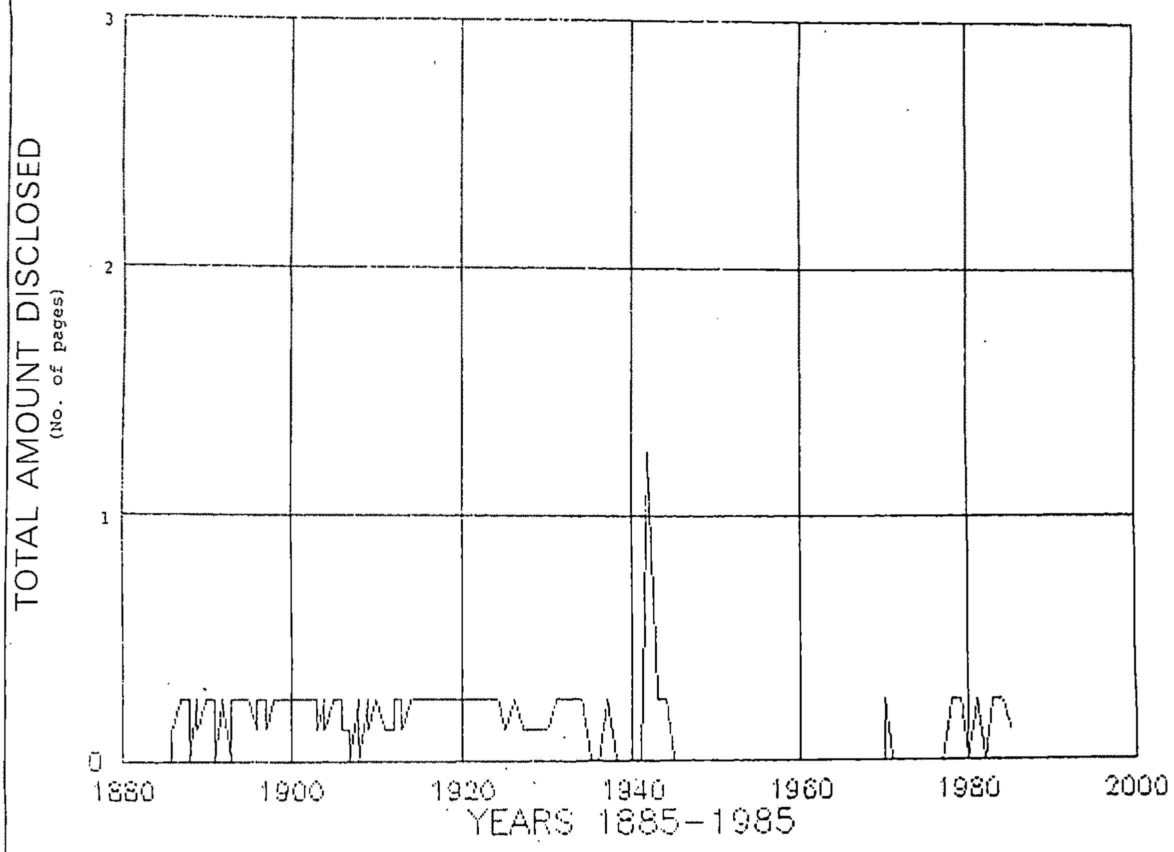
CSR. This method of correlating frequency graphs with socio-economic events was adopted from the research method employed in the historical study by Lewis *et al.* (1984). Its requirement of concurrence between timing of high frequencies of disclosure and related activities or events represents a quite stringent test of relationship and may exclude some events or activities where disclosure by BHP suffered significant time lags.

*Environmental Impact Disclosures*

Figure 2 presents the timing and frequency of environmental impact disclosure by BHP. With the exception of a period around 1950, disclosures were made post-1970. Trengove (1975) observed that from the 1960s, BHP upgraded its public relations departments and spent huge sums preserving the environment and promoting the company's image. In the 1970s the mining, steel and oil industries became targets for criticism by conservationists and a sizeable proportion of BHP's advertising and public relations budget was expended in attempting to allay their suspicions. While the company spent major sums on pollution control, it was still subject to accusations of environmental despoilation. While post-1970 social disclosures might be seen as reactive attempts at legitimising its activities, its earlier history does not support that theory. Blainey (1968) noted that BHP's mines and smelters in Broken Hill subjected that town to highly dangerous levels of lead poisoning from 1880 to 1900, and poor mining techniques induced serious ground movements. Woodward (1952) reports that the Broken Hill population suffered abnormally high levels of fibrosis of the lung and lead poisoning. In spite of controversy, and even a 1892 government board of enquiry (at which evidence that less than 2% of employees in BHP block 14 had escaped lead poisoning was tendered) (Trengove, 1975), no CSR appeared in BHP annual reports.

BHP's record of environmental disclosure has been relatively recent and somewhat patchy. It appears to have responded to public pressure in

**Figure 5**
**Community Involvement Enclosure**



more recent times but not in earlier periods. As such, this evidence provides somewhat marginal and inconclusive support for a legitimacy theory explanation of environmental disclosure.

*Energy Disclosures*

Figure 3 presents the timing and frequency of energy related disclosures by BHP. These have been infrequent, with peaks grouped in the 1890–1910 and post-1970 periods. Histories of BHP, the Broken Hill silver, lead and zinc mines, and the Australian iron and steel industry reveal no events or issues of major significance that could be linked to the energy disclosures observed in BHP annual reports. A legitimacy theory explanation of energy disclosure could therefore not be supported.

*Human Resource Disclosures*

Figure 4 presents the timing and frequency of human resource disclosures by BHP. It is a pattern of high but fluctuating levels of disclosure with a generally declining trend between the 1880s and 1940s and a rising trend (although at a slower rate) from the 1940s to the 1970s. Peaks of disclosure occurred around the years 1888–1892, 1909, 1920–21, 1955 and 1968–1972. Four of these high disclosure periods do coincide with or immediately follow significant human resource events in BHP's history. The year 1892 saw an 18 week strike over a switch to piece rates. It proved to be one of the bitterest industrial disputes Australia had known (Blainey, 1968). BHP was also affected by the 1889 strike by the Amalgamated Miners' Association for not having dismissed non-union employees and in reply sent a manifesto to shareholders listing advantages enjoyed by BHP employees. The bursting of the 1880s boom saw industrial strife all over Australia in the 1890s, with antagonism between unions and employers taking on the dimensions of a class battle between capital and labour. The strike of 1892 was broken by BHP, but it laid the foundations for BHP's antipathy towards unions and past strikers (Trengove, 1975).

The peak disclosures of 1909 coincide with further industrial relations problems. When metal prices declined in 1908, BHP directors feared the end of the silver, lead and zinc mines' profitable life, and displayed a 'provocative and uncompromising hostility to the miners' demands' (Hughes, 1964, p. 60). Indeed they attempted to reduce wages, thus precipitating a bitter strike (which the unions labelled a lockout) in 1909 which lasted 20 weeks. The union finally won a wages agreement equivalent to previous arrangements but lost £265,000 in men's wages during the strike, and with depressed markets BHP was slow to reopen the mine, did not re-engage troublemakers and left 2,500 unionists unemployed (Blainey, 1968; Trengove, 1975).

Human resource disclosures of 1920–1921 followed on the heels of a prolonged strike at Broken Hill during 1919–1920 (McLennan, 1974). Indeed after a wave of strikes in New South Wales in 1917, BHP attempted to form a company union along US lines, but this only added further to workers' hostility towards the company and the move had failed by 1919 (Hughes, 1964). The April to November 1919 strike was called over unhealthy working conditions. Unions won a 35 hour week, no night shift and a pension for 259 employees found by a Royal Commission to be suffering tuberculosis and pneumoconiosis (Blainey, 1968). The commission found that dust disease could occur after only seven years' exposure and recommended compensation, ventilation, water use and other safety procedures. This lead to the Workmen's Compensation Acts of 1920 and 1922 (Woodward, 1952).

Human resource disclosures in the mid-1950s again coincided with the incidence of frequent and prolonged stoppages in the 1950s. BHP was adamant in its refusal to bargain with unions on such matters as bonus payments, wanting instead to deal directly with the individual workers. While amenities such as showers, lockers and lunch rooms were improving (due to changing management attitudes and New South Wales Government regulations), as were steel plant working conditions (with reduced heat, fumes and noise, better protective clothing and elaborate safety systems), BHP was still reluctant to increase wages and vigorously recruited migrant labour to fill its labour shortage (BHP, 1960; Wills, 1963; Hughes, 1964).

An exception to the observed relationship between human resource problems and disclosures is apparent when peak disclosures of the late 1960s and early 1970s are examined. No significant industrial or labour-related disputes or problems were documented for that period. Further exceptions also appear in another sense. Major industrial unrest also affected BHP in the mid-1930s and through the 1940s. In 1936 a strike occurred over BHP's limiting its employment of skilled workers and increasing compulsory overtime even though unemployed labour was available (Hughes, 1964; Trengove, 1975; Davidson and Stewardson, 1979; Sheridan, 1981). These periods of significant industrial relations problems do not appear to be related to high frequency human resources disclosures by BHP. The evidence for a legitimacy theory explanation of BHP human resource disclosures is therefore somewhat contradictory. Some periods of major industrial relations difficulties were reflected in increased human resource disclosures by BHP while others were not. In addition, more recent times have seen higher levels of disclosure unrelated to any major industrial relations difficulties. Whether BHP made human resource disclosures reactively appears to have been a matter of management choice.

### *Community Involvement Disclosures*

Figure 5 presents the timing and frequency of community involvement disclosures by BHP. These have been noticeably consistent across the years but at a relatively low level. The only major identifiable peak occurred in the early 1940s. The only significant event in BHP history that preceded this was the establishment of what was essentially the BHP town of Whyalla for shipbuilding. As occurred with its smelting operations in the town of Port Pirie, BHP's approach to the community differed from its attitude in Broken Hill. As the paternalistic 'master' of these company towns it demonstrated a more positive attitude to its community relations (Trengove, 1975; Aungles and Szelenyi, 1979). The relatively consistent (though low) level of disclosure through the 1890–1930 period does not reflect BHP's differential community relations policies during that period. Its tenure at Broken Hill in the years 1885 to the 1920s was marked by criticism of BHP's lack of a sense of community with the town (Trengove, 1975; Kennedy, 1980). In contrast, from 1917 onwards it supported a wide range of positive community support programs in Port Pirie and later in Whyalla. In Port Pirie for example, these included subsidised contributions to accident funds, a dental clinic, an eyesight conservation scheme, charitable donations, housing loans, advice on housing construction, playgrounds and nursery (Woodward, 1952). It therefore appears that the pattern of BHP's community involvement disclosures is not well explained by legitimacy theory. Disclosure does not appear to have been related to any particular events in company history, and remained relatively consistent through periods when company policy towards community relations changed significantly.

## Legitimacy's questionable relevance

The evidence examined in this historical case study has failed to confirm legitimacy theory as an explanation of BHP's CSR over time. In general, little correspondence was found between peaks of

BHP's CSR disclosures and key socio-economic events affecting BHP during its operating history. Indeed numbers of significant events were not reported and at other times reporting occurred when no extraordinary socio-economic events appear to have occurred. A relationship between legitimacy theory and disclosure was only marginally supported for environmental issues, unconfirmed for energy and community issues, and subject to contradictory evidence for human resource issues.

Further doubt is cast upon the validity and relevance of legitimacy theory in this case by historians' observations that in the mid-1920s BHP grew increasingly secretive and uninformative in its reports and kept politicians at arm's length. Further, in the mid-1940s BHP still appeared to have a conservative approach to the media, refusing to comment on issues and problems till settlement had been reached (Trengove, 1975; Sheridan, 1982). That it could be impervious to social pressure was for instance demonstrated by its refusal to support a welfare plan subscribed to by other mines in Broken Hill in the 1913–1917 period. The company refused appeals from the Hospital Board and the Mine Managers' Association (Blainey, 1968).

The evidence examined therefore does not suggest that legitimacy theory is adequate as a means of explaining BHP's social disclosures during the period studied. Disclosures observed did not on the whole appear to be made as a consistent reaction to economic, social or political conditions or events. Indeed the company's tendency towards little or no reporting at some times is inconsistent with a legitimacy theory of management reporting information in an attempt to legitimise its actions in the perceptions of employees, government and the public.

## Conclusion

This study of CSR has employed historical and content analysis research methods to investigate the disclosure policies of a major Australian corporate monopoly through the medium of its annual report to shareholders over a 100 year period.

As in the case of US Steel, BHP's corporate reports were found to exhibit a variable pattern of total social disclosure levels over their history. While disclosures in these companies' reports to shareholders have occurred over many decades, such disclosures did not extend to any significant attempts at candid appraisal of their social performance. Human resource and community involvement were the predominant categories of disclosure for both corporations and both were prepared to disclose 'bad news' information from time to time. Thus, the results of this study tend to support Hogner's (1982) contention that CSR is a long established practice.

A number of qualifications must be made with respect to the findings of this study. The testing of legitimacy theory as an explanation for BHP's social disclosures relied upon the matching of peak disclosure periods with periods of significant social, economic or political events affecting the company. This method imposes a relatively stringent test of coincidence that may not account for any unidentified time lags between events and their eventual disclosure in BHP's corporate reports. In addition the results must be qualified in that the analysis was restricted to CSR via the annual report (albeit as the major medium of corporate communication to outside parties and shareholders). Of course the findings are also limited by their being the product of a particularistic study of one major company.

While Hogner (1982) hypothesised that legitimacy theory may constitute a primary explanation for US Steel's social disclosures, this study attempted to assess the available evidence for a legitimacy theory explanation of BHP social disclosures. To that end observed peaks of disclosure frequency over time (for major social themes) were compared against relevant social, economic and political events in BHP and its industrial history in the same or immediately preceding time periods. The analysis failed to confirm legitimacy theory as the primary explanation for CSR in this particular corporate case.

It is evident, then, that in the BHP case, a richer more robust theory is required to explain the observed historical pattern of CSR. Political economy of accounting theory may prove to be another potential candidate for this role. Its proponents (Tinker 1980; Cooper 1980; Cooper and Sherer 1984; Tinker and Neimark 1987) suggest that corporate disclosure is a proactive process of information provided from management's perspective, designed to set and shape the agenda of debate and to mediate, suppress, mystify and transform social conflict. This theory recognises the potential for management to tell its own story or refrain from doing so, according to its own self-interest. Whether it can adequately explain CSR will be the subject of further research.

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# The Relevance of a Segment Cash Flow Statement in Lending Decisions: An Empirical Study

**Donna L. Street and Keith G. Stanga***

**Abstract**—The purpose of this study is to examine the relevance of a segment cash flow statement in the lending decisions of commercial bank loan officers. 117 loan officers made short term, intermediate term, and long term lending decisions using case materials prepared for a company that operates in two industries—soft drinks and farm machinery/equipment. Results indicate that segment cash flow statements are relevant in lending decisions under certain circumstances. When given the 'good news' that a stable industry was the cash source, loan officers in the soft drinks group granted more long term loans than those in the control group. When given the 'bad news' that a troubled industry was the cash source, loan officers in the farm group made smaller short term loans than those in the control group.

## Introduction

A segment cash flow statement may be a promising means for improving the accounting information set currently required by generally accepted accounting principles (GAAP). Yet virtually no empirical research has been reported to assist policy makers in determining whether diversified companies should be required to disclose this type of information.

The objective of this study is to examine the relevance of a segment cash flow statement in the lending decisions of commercial bank loan officers. Given the recent emphasis on cash flow information and evidence that the disclosure of conventional segment data influences user decision processes (for a review of this literature see Mohr, 1983; Baldwin, 1984) empirical research is needed to determine the impact of *segment* cash flow statements on the decisions of financial statement users. We conducted a study in the US to address this issue and found that segment cash flow statements are relevant in certain situations.

In the next section, we present the rationale for the study. This is followed by sections that explain the research design and experimental results. The final section presents the conclusions and major limitations.

## Rationale for the study

### *Cash Flow Information*

In November 1987, the Financial Accounting Standards Board (FASB) issued Statement of Financial Accounting Standards (SFAS) No. 95, which requires a statement of cash flows as part of a full set of financial statements. SFAS No. 95 (1987) requires the reporting of cash flow information on an aggregate basis (i.e., for the entire company); it does not require diversified companies to report segment cash flow information. SFAS No. 95 superseded Accounting Principles Board (APB) Opinion No. 19 (1971), which had required companies to include a statement of changes in financial position among the financial statements. Although APB Opinion No. 19 had allowed companies to prepare the statement of changes in financial position using either a cash or working capital definition of funds, a trend towards the cash focus had developed in the US in recent years (Beresford and Neary, 1984). Thus, even before the FASB issued SFAS No. 95, most US companies were presenting their statements of changes in financial position using a cash focus.

### *Segment Reporting*

In the US, reporting for segments of diversified companies is governed by SFAS No. 14 (FASB, 1976) and minor amendments. Under SFAS No. 14 (paras 22–27), public enterprises are required to report the following major items of information for each reportable segment:

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*The authors are, respectively, assistant professor of accounting at James Madison University, Virginia and professor of accounting at the University of Tennessee, Knoxville. They acknowledge the helpful comments of two anonymous referees.

1. Revenues
2. Operating profit or loss
3. Identifiable assets
4. Other disclosures:
    (a) Aggregate depreciation, depletion, and amortisation expense.
    (b) Capital expenditures.

The above requirements emphasise income statement and balance sheet data. The only information that relates to cash flows is operating profit plus depreciation (which is merely a simplistic cash flow surrogate), and capital expenditures.

The International Accounting Standards Committee (IASC) has also issued a pronouncement on segment reporting. IAS No. 14 (IASC, 1981, para. 22) recommends the disclosure of segment sales or other operating revenues, segment operating profit, segment assets, and the basis of inter-segment pricing. In Great Britain, the Accounting Standards Committee (ASC) is currently working on a segment reporting standard.

### *Cash Flow Information by Segments*

Rappaport and Lerner (1969) have argued that a segment funds statement is a potentially valuable information source for users of diversified companies' financial statements. They state (1969, p. 39) that by analysing a segment funds statement, investors and creditors may be able to answer such important questions as whether the company's funds are committed to high-growth projects or used up by low-growth projects, and whether low-growth activities exist that may drain the company's funds.

The FASB published *Reporting Funds Flows, Liquidity, and Financial Flexibility* (1980a), which discusses the issue of providing funds flow information for segments of diversified companies. This document states (para. 123) that:

> Information about the funds flow associated with different segments of an enterprise may be important for investors and creditors. At various times, an enterprise may be generating net funds inflows in one segment of its operations and using those funds in another. It may be expanding or acquiring new lines of business and contracting or disposing of others. Information to distinguish the segments of the business that generate funds flows from those that use funds may be useful in evaluating the overall performance of an enterprise and in assessing its prospects for future cash flows. That information currently is not required to be disclosed.

The events theory of accounting (Sorter, 1969) suggests that segment cash flow statements would be preferable to the consolidated statement now required by GAAP. If segment cash flow statements were reported, financial statement users could incorporate the disaggregated information in their decision models, or they could aggregate the data. If only the consolidated statement is reported, users have no choice.

If segment cash flow information is relevant, one might argue that bank loan officers should simply demand it from diversified companies before granting a loan. However, based on in-depth interviews with 74 loan officers in the US, Backer (1970, p. 38) found that:

> Bankers interviewed reported that they make some credit decisions with a minimum of financial information because some borrowers refuse to divulge more. For example, instances were cited in which large corporations refused to supply more than published annual reports. These companies usually have excellent credit ratings and competition among banks for such accounts is strong. To insist on additional information might result in loss of customers. In other cases, customers lack a sufficiently good accounting system to supply certain information...

The bankers that Backer interviewed generally felt that the accounting profession should do a better job of satisfying their informational needs within the traditional GAAP financial statements.

Increased competition in the banking industry during the 1980s has placed additional limits on the information that loan officers can obtain. If loan officers pressure customers to supply certain types of information, customers may simply take their business elsewhere. During the fall of 1985, we interviewed five loan officers who represented three different banks. These loan officers stated that although they frequently have asked diversified companies for segment cash flow information, companies are often unwilling to provide it.

### *Criterion To Evaluate Segment Cash Flow Statements*

According to Statement of Financial Accounting Concepts (SFAC) No. 1 (FASB, 1978), the primary objective of external financial reporting by business enterprises is to disclose useful information. SFAC No. 2 (FASB, 1980b) indicates that relevance is a quality that useful information must possess. Furthermore, 'it is information's capacity to "make a difference" that identifies it as relevant to a decision' (FASB, 1980b, para. 46).

Segment cash flow statements for real companies are not available for use in research; thus no criterion value is available to determine whether the statements would improve the quality of user decisions. Nevertheless, theoretical support exists for including segment cash flow information in the financial statements of diversified companies, as explained in the previous section. Thus, if loan officers who receive segment cash flow statements make significantly different decisions from those who do not, an argument can be made that the information has made a difference and is therefore relevant to the lending decision.

## Research methods

### *The Design*

Loan officers were randomly assigned to three groups. Each loan officer was then mailed (1) a case study and (2) a decision response form. The case study differed between the three groups only in the type of segment cash flow information that was included. The loan officers were asked to make three independent loan recommendations for a company that operates in two industries. One industry is stable, with a history of consistent profitability, while the other has experienced serious financial troubles in recent years with no recovery expected for several years. Using these two kinds of industries tended to force a more careful analysis of the company than if both industries were in either excellent or poor financial condition. Also, confining the design to only two segments allowed us to provide the desired experimental treatments while keeping the case studies reasonable in size and complexity.

Based on an examination of *Standard & Poor's Industry Surveys* and the *Value Line Investment Survey*, we selected soft drinks to represent a stable US industry and farm machinery/equipment to represent a troubled US industry at the time of our empirical work. Our interviews with loan officers confirmed that soft drinks would be readily perceived as a stable industry and that farm machinery/equipment would be readily perceived as an industry in serious trouble. Each group received a common information set that differed only as follows:

GROUP 1, the CONTROL GROUP, received only the limited segment cash flow disclosures currently required by SFAS No. 14.

GROUP 2, the SOFT DRINKS GROUP, received the segment cash flow disclosures required by SFAS No. 14 plus a complete segment cash flow statement indicating that:

(1) A stable industry (soft drinks) had been the sole source of cash for the past three years.
(2) An industry in serious trouble (farm machinery and equipment) had been a user of cash for the past three years.

GROUP 3, the FARM GROUP, received the segment cash flow disclosures required by SFAS No. 14 plus a complete segment cash flow statement indicating that:

(1) An industry in serious trouble (farm machinery and equipment) had been the sole source of cash for the past three years.
(2) A stable industry (soft drinks) had been a user of cash for the past three years.

On the decision response form, each loan officer was asked to make three independent lending decisions: a short-term (six-month) loan of $1,000,000, an intermediate-term (three-year) loan of $5,000,000, and a long-term (seven-year) loan of $8,000,000. In order to avoid manipulating the segment receiving the loan, the decision response form indicated that the money represented by each loan would be used by the soft drinks division. This is an important control because, as suggested earlier, one reason that segment disclosures may be useful is that they reveal information about corporate strategy. By controlling the segment receiving the loan, our goal was to create a decision environment in which there is a consistent corporate strategy of investing in a division that operates in a stable industry (i.e., soft drinks).

For *each* of the three decisions, the subjects were asked to indicate (1) the amount they would be willing to lend the company, and (2) the increment above the prime rate they would charge. In addition, by their response to the amount question, the subjects indicated (3) whether they would grant a loan. That is, if $0 were loaned, then no loan was made, and of course, no interest rate was indicated.

Thus the dependent variables are (1) whether a loan was made (a dummy variable that we shall call *no loan*), (2) the amount of the loan, and (3) the interest rate charged. The third variable was derived by adding a prime rate of 7.5%, obtained from the *Wall Street Journal* during the survey period, to the increment above the prime rate that each loan officer indicated. The prime rate was 7.5% throughout most of the period of our empirical work. The prime rate was added to distinguish between the case in which no loan was granted and the case in which a loan was granted at the prime rate (i.e. no increment above the prime rate).[1] The independent variable, which has three levels, is the type of segment cash flow information.

Because soft drinks was a stable industry and farm machinery and equipment was in serious trouble, we expected that the segment cash flow statements provided to the *soft drinks group*, if used

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[1] We felt that this approach provided the subjects with a realistic, familiar decision task. During our interviews, loan officers indicated that they frequently grant a loan but choose to lend less than the requested amount. An approach used by Libby (1979), Johnson and Pany (1984), and McKinley, Pany, and Reckers (1985) required subjects to (1) accept or reject a loan request, and (2) if accepted, to determine the increment above the prime they would charge, or if rejected, estimate the rate another financial institution would charge. This approach is limited because it denies the subject the option of lending less than the requested amount. Moreover, Schultz (1979) has criticised this approach, arguing that loan officers probably cannot provide accurate estimates of rates that other financial institutions would charge.

in the decision process, would be interpreted as 'good news' and would increase the loan officers' confidence in the company's ability to generate cash in future periods. If segment cash flow statements are relevant, then compared to loan officers in the control group, the loan officers in the soft drinks group would be expected to take *one or more* of the following actions: grant more loans, lend larger amounts of money when a loan was granted, and/or charge lower rates of interest when a loan was granted.

The fact that soft drinks was stable and farm machinery and equipment was troubled also led us to expect that the segment cash flow statements provided to the *farm group*, if used, would be interpreted as 'bad news' and would tend to make the loan officers feel less confident that the company could continue to generate sufficient cash in future periods. Accordingly, compared to loan officers in the control group, the loan officers in the farm group would be expected to take *one or more* of the following actions: grant fewer loans, lend smaller amounts of money when a loan was granted, and/or charge higher interest rates when a loan was granted.

Although the study could have been conducted using only the control and soft drinks groups, adding the farm group enhances the study's external validity and allows a determination of whether the subjects reacted to the *information content* of the segment cash flow disclosures and not merely to the positive fact that the soft drinks case included additional segment information. For example, if subjects in the soft drinks group were to grant more loans than those in the control group, one might argue that subjects in the soft drinks group were simply responding favourably to the fact that the company reported more extensive segment cash flow information. Adding a farm group allows us to determine whether the subjects would react in an appropriately negative manner to the disclosure of additional segment cash flow information.

### *The Case Studies*

The decision about what information to provide in the case studies was based on a review of the relevant literature and on interviews with loan officers. Each subject received a case study containing the following information:

1. A brief history of the company including a description of the business of each segment.
2. Information about management.
3. Three years of consolidated income statements.
4. Three years of consolidated balance sheets.
5. Three years of consolidated statements of cash flows.
6. Three years of commonly used financial ratios.
7. Three years of segment disclosures required by SFAS No. 14 (sales, operating profit, identifiable assets, depreciation and amortisation expense, and capital expenditures).

*In addition* to the above information, members of the treatment groups (soft drinks and farm) received *segment* cash flow statements. Thus, *only the type of segment cash flow information was allowed to vary between groups*. Because the study was conducted in the US, financial reporting standards in the US were observed in preparing information for the case study. The guidelines of APB Opinion No. 19 were followed in preparing the cash flow statements because SFAS No. 95 had not yet been issued. Thus we provided cash flow information to the loan officers in a format they were accustomed to using.

We constructed the financial statements for a company that operates in two industries, soft drinks and farm machinery/equipment, and tried to make the financial statements appear to be those of a real company. We began by preparing two sets of financial statements, one set for a soft drinks company and the other for a farm machinery/equipment company. These statements were prepared based on industry average financial ratios published in *Robert Morris Associates Statement Studies* and in the *Almanac of Business and Industrial Ratios*. After preparing the two sets of statements, they were consolidated. Then we prepared the segment information that is currently required by GAAP, and finally, the experimental segment cash flow information. Annual reports of companies operating in the soft drinks and farm machinery/equipment industries were also studied to determine ways of making the statements appear more realistic.

The case studies had other important characteristics. First, to prevent size from acting as a confounding factor, the two segments were of approximately equal size. Second, consolidated financial statements indicated that the company was performing at the average for the industries involved and was in reasonable financial condition. We felt that if the company were in either very good or very bad condition, this might cause the loan officers simply to grant or deny the loan with limited financial analysis. Finally, we tried to avoid drawing attention to the segment cash flow information and thereby sensitising the loan officers to the experimental variable. The cover letter stated that the study's purpose was simply to investigate ways to improve reporting for diversified companies.

To help create a realistic situation that would tend to force a careful analysis of the financial statements, subjects were told to assume that:

1. The credit applicant was a new customer that could eventually establish a long term relationship with the bank.
2. The applicant's financial statements had been audited by a reputable accounting firm and received an unqualified opinion.
3. The applicant had no legal restrictions that would prevent it from obtaining loans.
4. The applicant would be required to maintain at the bank a compensating balance of 10% of the loan.

### *Pilot Test*

After the case studies had been pre-tested and revised several times, a pilot test of 13 loan officers in two US states was conducted during the spring of 1986. Results indicated that the loan officers felt comfortable with the task and that the financial statements were regarded as realistic. No request was consistently made for any information not included in the case study. The subjects' responses also indicated that the case study did not contain any errors or ambiguities. As further evidence of the perceived realism of the financial statements, one subject in the main survey telephoned and asked to use the statements, after our study was completed, in a training session at his bank.

### *The Subjects*

Subjects were selected from commercial bank loan officers at the largest US commercial banks. Lending officers at larger banks were selected because they are more likely to do business with diversified companies and because they are generally more sophisticated information users than are lending officers at smaller banks.

After removing six banks located in Puerto Rico from a list of the 300 largest banks, we sent a letter requesting loan officer participation in the study to the senior lending officer at each of the remaining 294 banks. To avoid the possibility of sensitising subjects who would later receive the case studies, the purpose of the study was stated as determining methods of improving reporting for diversified companies.

The senior officers were asked to recommend loan officers to serve as subjects, including themselves if they so desired. The loan officers recommended were expected to be experienced in financial statement analysis and have the authority to make, or participate in the decision to make, loans in the five to ten million dollar range.

After two mailings to the senior officers, 167 loan officers had been recommended as potential subjects. Each of the 167 loan officers was randomly assigned to one of the three groups. During the summer of 1986, each loan officer was mailed the appropriate case and the decision response form.

After two mailings to the 167 loan officers, 117 (70%) returned their completed response forms. The respondents represented 78 banks.[2] The number of responses in each group was about equal: control group, 41; soft drinks group, 37; and farm group, 39. The respondents had an average (mean) of 10.6 years of experience in commercial banking and had taken an average of five accounting courses at the college or university level. Approximately 95% had earned at least a bachelor's degree, and 53% had earned a master's degree.

Statistical analyses included a test for nonresponse bias. T tests were conducted within each subject group to determine whether significant differences existed between the responses of first-mailing and second-mailing respondents on the amount and rate variables for each type of loan decision. Eighteen t tests yielded only one significant difference (at $\alpha = 0.10$), which is less than the number that would be expected due to chance alone. Although this evidence fails to indicate a material nonresponse bias, such a bias may nonetheless exist.

### *Hypotheses*

Two major research hypotheses were tested. First, the soft drinks group is expected to make significantly different decisions from the control group.

Hypothesis 1:

$$\mu_{\text{SOFT DRINKS}} \neq \mu_{\text{CONTROL}}$$

where

$$\mu = \text{dependent variable mean vector}$$

The dependent mean vectors for these groups are expected to differ because, as explained earlier, the loan officers in the soft drinks group are expected to take *one or more* of the following actions: make fewer 'no loan' decisions (i.e., grant more loans), lend larger amounts of money when a loan is granted, and/or charge lower rates of interest when a loan is granted.

Second, the farm group is expected to make significantly different decisions from the control group.

Hypothesis 2:

$$\mu_{\text{FARM}} \neq \mu_{\text{CONTROL}}$$

The farm and control dependent mean vectors are expected to differ because the loan officers in the farm group are expected to take *one or more* of the following actions: make more 'no loan' decisions (i.e., grant fewer loans), lend smaller amounts of

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[2] The maximum number of respondents from any bank was four. An analysis of responses by bank indicated that subjects representing the same bank worked independently.

**Table 1**
**Dependent Variable Means by Group**

| | Control Group | Soft Drinks Group | Farm Group |
|---|---|---|---|
| *Short-Term Decision* | | | |
| No Loan | 0.02 | 0.0 | 0.05 |
| Amount when a loan was granted | \$1,000,000 | \$1,000,000 | \$929,756 |
| Rate when a loan was granted | 8.09 | 8.02 | 7.95 |
| *Intermediate-Term Decision* | | | |
| No Loan | 0.22 | 0.05 | 0.23 |
| Amount when a loan was granted | \$2,933,333 | \$2,884,615 | \$2,814,285 |
| Rate when a loan was granted | 8.49 | 8.39 | 8.49 |
| *Long-Term Decision* | | | |
| No Loan | 0.20 | 0.0 | 0.28 |
| Amount when a loan was granted | \$7,090,909 | \$7,000,000 | \$7,335,294 |
| Rate when a loan was granted | 8.85 | 8.68 | 8.83 |

money when a loan is granted, and/or charge higher interest rates when a loan is granted.

## Results

### *MANOVA*

Group means for the dependent variables are presented in Table 1. The 'no loan' variable was assigned a value of 0 when a loan was granted and 1 when a loan was denied. Therefore, the mean of the 'no loan' variable represents the percentage of loan officers that did *not* grant a loan. Notice that for all three decisions, the soft drinks group granted the most loans while the farm group granted the fewest. Of course, any of the results shown in Table 1 may simply have occurred *by chance*. Our next step was therefore to analyse the data to determine whether any results are significant.

For each of the three types of lending decisions, a one-way multivariate analysis of variance (MANOVA) was used to determine if the decisions of the three groups were affected by the type of segment cash flow information.[3] After establishing the existence of overall multivariate significance, multivariate planned comparisons (simple contrasts) were conducted to compare each treatment group against the control group. When the MANOVA contrasts indicated significant differences, univariate tests were performed on each of the dependent variables. Multivariate discriminant analysis (MDA) was also performed. The univariate tests and the MDA aided in determining which dependent variables were affected by the type of segment cash flow information.

The MANOVA global test results, Table 2, indicate that the type of segment cash flow information had a significant impact ($\alpha = 0.10$) on the short-term and long-term decisions.[4] Table 3 shows that, when comparing the soft drinks group against the control group (hypothesis 1), the null of no effect could not be rejected for the short-term or intermediate-term decisions. However, significantly different decisions were made by the soft drinks and control groups for the long-term decision. Univariate results show that multivariate significance was mainly due to a significant difference on the 'no loan' variable. Specifically, the 'no loan' variable was significantly lower for the soft drinks group indicating that this group granted more loans, as expected.

Table 4 shows the results of tests for significant differences between the decisions of the farm and control groups (hypothesis 2). For the short-term decision, the null of no effect is rejected. Univariate results indicate that when a loan was granted, the farm group loaned significantly less money than

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[3] Before using MANOVA, we determined whether any of its assumptions were violated and carefully considered the effects of any violations. In this study, an argument can be made that using a dummy variable violates the multivariate normality assumption. However, given the relatively large number of observations (117), the multivariate central limit theorem helps assure that the consequences of such violations are minor (Stevens, 1986, p. 207). MANOVA testing is also based on the assumption that the population covariance matrices for the dependent variables in each group are equal. Although tests revealed that this assumption is violated, research has shown that the test statistics used in this study are fairly robust if the groups' sample sizes are comparable (Olson, 1974 and 1976). As previously discussed, cell sizes were nearly equal in this study; therefore the use of MANOVA seems appropriate.

[4] When using MANOVA, one must choose between several test statistics. Based on a review of the statistical literature concerning the power and robustness of the most popular tests, Olson (1976) recommends the Pillai-Bartlett trace statistic for general use. The Pillai-Bartlett trace is relatively well protected against occasional deviant eigenvalues resulting from assumption violations. As in most studies, the Pillai-Bartlett trace, the Hotelling-Lawley trace, and Wilk's criterion yielded similar results in our study.

**Table 2**
**MANOVA Global Test Results: No Loan, Amount, and Rate**

| | *df* | *Pillai-Bartlett's Trace* | *F-Value* |
|---|---|---|---|
| Short-Term Decision | 6,222 | 0.1035 | 2.02* |
| Intermediate-Term Decision | 6,218 | 0.0821 | 1.56 |
| Long-Term Decision | 6,206 | 0.1173 | 2.14** |

$^*p < 0.10$
$^{**}p < 0.05$.

**Table 3**
**Multivariate and Univariate Results for Testing Hypothesis 1 (Soft Drinks vs. Control)**
*Multivariate Tests*

| | *df* | *Pillai-Bartlett's Trace* | *F-Value* |
|---|---|---|---|
| Short-Term Decision | 3,110 | 0.0075 | 0.28 |
| Intermediate-Term Decision | 3,108 | 0.0524 | 1.99 |
| Long-Term Decision | 3,102 | 0.0579 | 2.09* |
| *Univariate One-Tailed Tests:*<br>*Long-Term Decision* | | | |
| No Loan | 1,106 | | 5.50*** |
| Amount when a loan was granted | 1,64 | | 0.05 |
| Rate when a loan was granted | 1,64 | | 0.73 |

$^*p < 0.10$
$^{***}p < 0.01$.

**Table 4**
**Multivariate and Univariate Results for Testing Hypothesis 2 (Farm vs. Control)**
*Multivariate Tests*

| | *df* | *Pillai-Bartlett's Trace* | *F-Value* |
|---|---|---|---|
| Short-Term Decision | 3,110 | 0.0759 | 3.01** |
| Intermediate-Term Decision | 3,108 | 0.0322 | 1.20 |
| Long-Term Decision | 3,102 | 0.0155 | 0.53 |
| *Univariate One-tailed Tests:*<br>*Short-Term Decision* | | | |
| No Loan | 1,114 | | 0.50 |
| Amount when loan was granted | 1,111 | | 5.88*** |
| Rate when loan was granted | 1,111 | | 1.50 |

$^{**}p < 0.05$.
$^{***}p < 0.01$.

the control group, thereby supporting hypothesis 2. For the intermediate-term and long-term decisions, the null hypothesis of no effect could not be rejected.

### *Multiple Discriminant Analysis*

MANOVA tests allowed us to determine whether the three groups (control, soft drinks, and farm) made different lending decisions. When a significant difference is found, MDA may be used 'to characterize major differences among the groups. The major differences are revealed through the discriminant functions, and the problem is in interpreting these functions' (Stevens, 1972, p. 501).

As part of MANOVA, the SAS system calculates discriminant functions, which we analysed for the short-term and long-term loan decisions (i.e. those decisions for which significant results were obtained under MANOVA). For the short-term decision, only the first discriminant function was significant ($p < 0.06$). Ninety-three percent of the between variance is concentrated in the dimension represented by this function:

$$\text{Short-term canonical variate} = 1.147\,(\text{No loan}) + 0.0876\,(\text{Rate}) + 0.00000069\,(\text{Amount})$$

Next, the short-term canonical structure matrix was examined.[5] This matrix provided a means of relating the original dependent variables to the canonical breakdown of between-group variation. The discriminant function-variable correlations are as follows: no loan $= -0.37$; rate $= 0.34$; and amount $= 0.88$. Because amount is the original dependent variable that is most highly correlated with the discriminant function in an absolute value sense, the analysis implies that the amount loaned when a loan was granted is primarily responsible for the separation achieved on this dimension (see Stevens, 1986, p. 235).[6] This is consistent with the univariate results discussed earlier.

For the long-term loan decision, only the first discriminant function, shown below, is significant ($p < 0.05$).

$$\text{Long-term canonical variate} = 0.198\,(\text{No Loan}) - 0.013\,(\text{Rate}) + 0.00000000456\,(\text{Amount})$$

Ninety-nine percent of the between variance is concentrated in the dimension represented by this function.

To determine which of the original dependent variables are responsible for the between-group differences, the long-term canonical structure matrix was examined. The discriminant function-variable correlations are: no loan, 0.94; rate, $-0.86$; and amount, 0.74. These correlations imply that no loan is the key original variable related to separation of groups on this dimension. This is consistent with the univariate results presented earlier.

*Discussion of Results*

The results summarised above provide information to analyse the subjects' decision behaviour. For hypothesis 1, the null of no effect could not be rejected for the short-term or intermediate-term decision. In general, lending decisions tend to become more balance sheet oriented as the term of a loan shortens (Gibson, 1989, p. 243). Because the balance sheet indicated that the company was in reasonably good overall financial condition, the segment cash flow information indicating that the soft drinks segment was the primary source of cash was apparently interpreted as 'good news' and simply confirmed the balance sheet message.

MANOVA contrasts revealed that significantly different decisions were made by the soft drinks and control groups for the long-term loan. Univariate results and MDA indicated that this separation between groups occurred primarily because the soft drinks group granted more long-term loans than the control group. The results for the long-term decision suggest that, when loan officers are supplied with only the consolidated and limited segment cash flow disclosures required by SFAS No. 14, they make conservative (pessimistic) predictions of a diversified company's future cash flows. When supplied with additional segment cash flow information which shows that a segment operating in a stable industry is the primary source of cash, loan officers interpret this as 'good news' and adjust their estimates. This type of disaggregated data appears to increase their confidence in the company's ability to generate adequate cash to repay the loan; they are more likely to grant the company a loan.

For hypothesis 2, the MANOVA contrasts revealed that the farm group made significantly different short-term lending decisions than the control group. Univariate analysis and MDA suggested that this was primarily because the farm group loaned less money when a short-term loan was made. Although 'good news' did not affect the short-term decision, the 'bad news' that the farm machinery and equipment segment was the primary source of cash did affect the loan officers' decisions. Despite the reasonably strong balance sheet position of the company, the 'bad news' changed expectations, and the loan officers loaned less money to the company whose cash was being generated by an industry in serious trouble.

For the intermediate-term and long-term decisions, the null hypothesis of no effect could not be rejected for hypothesis 2. As previously discussed, loan officers in the control group appear to have made conservative estimates of the company's ability to generate cash in future periods. Segment cash flow information indicating that an industry in serious trouble, farm machinery and equipment, has been the source of cash for the past three years apparently reinforced these conservative estimates. The additional disclosure did not result in significant differences in the loan officers' decisions.

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[5] The canonical structure matrix used in this analysis contained the correlations between the canonical variate and each of the following: the no loan variable, amount when a loan was granted, and rate charged when a loan was granted. Using this matrix allowed us to determine whether the amount and rate variables were responsible for any additional between-group separation beyond the separation attributed to the no loan variable.

[6] Studies indicate that the discriminant function-variable correlations are very unstable unless sample size is large relative to the number of dependent variables. Unless N/p (N = total sample size; p = number of dependent variables) is at least 20, one must be extremely cautious in interpreting the results (Stevens, 1986, p. 236). For this purpose, at least 60 subjects (60/3 = 20) were needed in this study. Because 117 loan officers participated in the study, we can place reasonable confidence in our interpretations of the discriminant functions.

The study's results demonstrate that relevance depends on the decision at hand. Information that is relevant for one type of decision may not be relevant for another, even when relevance is determined in relation to the same user group. This finding underscores the need to recognise an important limitation of many empirical studies in accounting that focus on only a single type of user decision.

## Conclusions

Evidence from the study suggests that commercial bank loan officers attribute relevance to segment cash flow statements and would use the information in their lending decisions if it were available. Accounting policy makers may therefore wish to evaluate the costs and benefits of expanding financial reporting requirements for diversified companies to include a segment cash flow statement. Additional research is needed in this area—especially in the area of information costs—to assist policy makers in addressing this issue.

The segment cash flow statements used in this study were constructed according to the guidelines of APB Opinion No. 19, which was still in effect at the time of our empirical work. Now that SFAS No. 95 has been issued, future experimental research in the US on cash flow information can use the new reporting format that the FASB requires companies to use, beginning with annual financial statements for fiscal years ending after July 15, 1988. Of course, users will need a reasonable time period to become familiar with the new format before meaningful research can be conducted.

As with any empirical study, the current study has several limitations, and conclusions should be interpreted with caution. Because only one user group was studied, a need exists to determine whether the conclusions would also apply to other user groups. Moreover, a generalisation of the study's conclusions to other types of diversified companies may be inappropriate because the nature of the diversified company used in this study was not randomly determined. Finally, because segment cash flow statements of real firms were not available, we could not examine the question of whether these statements would improve the quality of users' decisions. These limitations highlight the need for additional research in this area.

Although this study has found that the disclosure of segment cash flow statements appears to affect lending decisions, more needs to be learned about how loan officers process the information and why it affects their decisions. A methodology such as verbal protocol analysis might contribute useful results in this regard.

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# The Effects of Organisational Culture on Choices of Accounting Methods

Andrew P. Thomas*

**Abstract**—This paper seeks to develop a theoretical framework for studying the effects of organisational culture on choices of corporate reporting practices. It is argued that enterprises can be conceptualised in terms of the extent to which they have a professional accounting sub-culture (PASC) reflecting the use of accounting as a symbol, language, ideology, ritual and myth. The research also includes an exploratory study of three types of measurement practices and three forms of voluntary disclosure of information. The results suggest that the concept of a PASC could be a useful theoretical construct and that it may influence the choice of certain measurement and disclosure practices.

There is a substantial body of research which suggests that management's choice of external reporting methods is influenced by a number of environmental variables and organisational attributes such as competition, risk, capital intensity, leverage/gearing, organisation size, etc. (Watts & Zimmerman, 1978; Hagerman & Zmijewski, 1979; Daley & Vigeland, 1983; Thomas, 1986). However, these studies give rise to several inconsistencies that are recognised and examined in detail by Watts & Zimmerman (1986). A further possible reason for the conflicting results of empirical research in this area is highlighted by a growing literature concerning the inter-relationship between organisational culture and accounting systems.

There is also considerable empirical evidence that the design of management accounting systems is influenced by a number of similar environmental variables and organisational attributes such as environmental uncertainty, technology, organisation size, etc (Hayes, 1977; Gordon & Narayanan, 1984; Govindarajan, 1984). However, this also contains several inconsistencies which may be explained by reference to variations in organisational culture.

One of the principal objectives of this research is to develop a theoretical framework for studying the effects of organisational culture on choices of corporate reporting practices. The other main aim is to provide an exploratory research instrument for investigating whether organisational culture influences the choice of certain measurement and disclosure practices. The paper starts by explaining the theoretical framework used in the study including a conceptual clarification of the various elements of organisational culture. It also describes how these are measured. Then an explanation is given of the reasons why the particular dependent variables were chosen and the hypotheses that were generated. This is followed by a description of the research method. The next section contains an analysis of the results. Lastly the possible implications and limitations of the findings are discussed together with some suggestions for future research.

## The theoretical framework

A simple model of the effect of the socio-economic environment and organisational culture on accounting systems is shown in Exhibit 1. The socio-economic environment is conceptualised in terms of uncertainty (as defined by Thompson, 1967; Duncan, 1972) and institutionalised rules, myths, etc. (Meyer & Rowan, 1977; Boland, 1982). 'Institutionalised rules are classifications built into society as reciprocated typifications or interpretations. Such rules may be simply taken for granted or may be supported by public opinion or the force of law' (Meyer & Rowan, 1977). Obvious examples of 'legal' rules are the Companies Acts and accounting standards. These have a direct influence on corporate financial reporting systems (CFRS) as shown in Exhibit 1. Examples of 'taken for granted' rules include criteria of efficiency and effectiveness, rationality and intelligent choice, etc. As indicated in the Exhibit, these influence management accounting systems (MAS) and CFRS (Berry *et al.*, 1985) via organisational culture.

However, accounting systems may be used by organisations to control their socio-economic environment shown as dashed lines in Exhibit 1. For example, developments in accounting practices give rise to particular conceptions of organisa-

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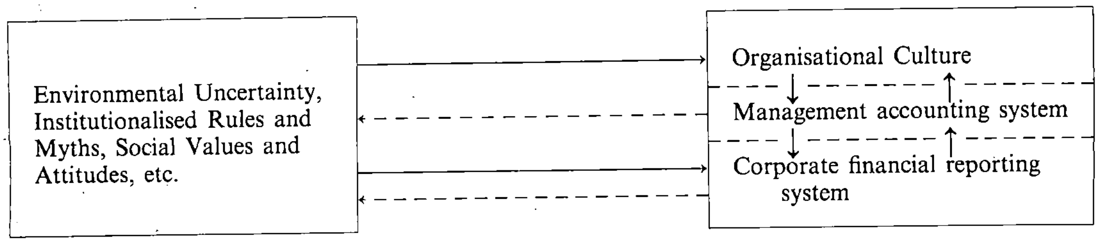
*The author is lecturer in accounting at the University of Birmingham.

**Exhibit 1**
**A Simple Model of the Effect of Environment and Organisational Culture on Accounting Systems**


Environmental Uncertainty, Institutionalised Rules and Myths, Social Values and Attitudes, etc.
Organisational Culture
Management accounting system
Corporate financial reporting system

tional efficiency and performance (Burchell *et al.*, 1980).

The conceptualisation of organisational culture and its relationship with accounting systems is discussed in depth later. There is already considerable empirical evidence that environmental uncertainty affects the design of MAS (Hayes, 1977; Gordon & Narayanan, 1984; Govindarajan, 1984). However, this contains a number of inconsistencies. A possible explanation for these is that the design of MAS is also affected by internal variables such as leadership style and management philosophy (Jones, 1985). However, this fails to acknowledge the influence of the environment and institutionalised rules on management styles. For example, the more an organisation is dependent on its environment for particular critical resources (e.g. finance) the more likely it is to recruit certain types of professional skills (e.g. accountants) (Pfeffer, 1972). The resulting balance of skills or dominance of certain professional ideologies gives rise to a particular management philosophy. A similar argument can be advanced with respect to the influence of the environment on the personality type of chief executives. For example, the existence of a declining market and militant trade unions may lead to the recruitment of authoritarian management (e.g. National Coal Board). Furthermore, there is considerable empirical evidence which indicates that environmental factors influence the style of management (Burns & Stalker, 1961; Woodward, 1965; Lawrence & Lorsch, 1967). This tends to suggest that leadership style and management philosophy are in the nature of intervening variables shown in Exhibit 1 as part of the organisational culture.

Several authors have examined the interrelationship between MAS and CFRS indicated in Exhibit 1. Two which are of particular relevance are Jones (1985) and Archer & Steele (1983). Jones argues that the impact of external reporting requirements upon MAS is likely to increase with the trend towards greater disclosure, for example to employees, and in the interests of minimising preparation costs. However, he found that none of the interviewees in his study mentioned CFRS as influencing their choice of MAS. On the other hand Archer & Steele (1983) interpret their findings as grounds for thinking that those circumstances which favour overt or covert use of CCA adjustments in management accounts decrease the likelihood of a negative compliance attitude towards SSAP16 (ASC, 1980). These two studies tend to suggest that MAS may have a greater influence on CFRS than vice versa. Furthermore, the impact of organisational culture and MAS on CFRS might also explain some of the inconsistencies in the empirical research relating to the effect of environmental factors on the choice of external accounting methods (e.g. Hagerman & Zmijewski, 1979; Daley & Vigeland, 1983; Thomas, 1986).

Clearly the conceptualisation and measurement of organisational culture are highly problematic. There are at least two generic interpretations of culture: culture as a variable, which relates to culture being something an organisation *has* that can be manipulated by management; and culture as a root metaphor, which relates to something an organisation *is* that no one person or group can control (for a fuller discussion see Smircich, 1983 and Dent & Green, 1985). Clearly management (and accountants) often seek to manipulate 'organisational culture'. They therefore see it as a variable. However, this author takes the view that culture is shaped through interaction, and thus culture and organisation are inextricably intertwined. Similarly, the meaning and significance of accounting practices can be viewed as either something an organisation *has* or alternatively something an organisation *is*. If one takes the latter perspective, that this is shaped through interaction, it therefore follows that organisational culture and the meaning and significance of accounting practices are inseparable.

A further issue concerns whether an organisation can be said to have a single culture. It has been argued that organisations, like societies, are multicultural (for a fuller discussion see Gregory, 1983; Dent & Green, 1985). Each of these different subcultures or groups is likely to have different values and beliefs, and attribute different meanings to accounting information. The study of the interrelationship between accounting and organisational culture may therefore involve building a model which embraces these differing perceptions of reality.

The next question that arises is the nature of organisational culture. There are numerous concepts and dimensions of culture that have been introduced into the recent accounting literature. These include symbols (Burchell *et al.*, 1980; Boland & Pondy, 1983), language (Burchell *et al.*, 1980; Cooper, 1981), ideology (Cooper, 1980; Cooper & Sherer, 1984), rituals (Wildavsky, 1976), myths (Boland, 1982), witchcraft, magic and ceremony (Gambling, 1977). These are often not defined and frequently used interchangeably. This is not conducive to rigorous scientific analysis. One of the main aims of this paper is to provide a clarification of these concepts in the hope that it may facilitate comparability and measurement.

Culture can be defined as the learned aspects of human society. Clearly this definition lacks analytical precision. It has therefore been suggested that culture comprises five main elements which are symbols, language, ideology, rituals and myths (Pettigrew, 1979). These also appear to be most frequently cited aspects of culture referred to in the accounting literature.

Given that organisations are multicultural, and that culture can be conceptualised in terms of the five main elements above, a simple model for analysing organisational culture may be constructed as shown in Exhibit 2. In this model sub-cultures take the form of functional or occupational groups. Alternatively these could consist of class cultures, managerial cultures, etc. Obviously this is still a gross simplification but it may provide a framework for building a picture of an organisation's culture.

The empirical research in this paper focuses on the professional accounting sub-culture (PASC) in organisations and involves the use of a postal questionnaire which was sent to the finance directors of a number of listed companies. This is only intended to be exploratory in that it may provide the basis for a much longer questionnaire. Other occupational sub-cultures would also be included in future studies if the research instrument proves adequate. Furthermore, it is hoped that the present survey will highlight some extreme cases and provide entry to companies in order to undertake further complementary studies involving interviews, observation and participation.

The nature and measurement of each of the five elements of organisational culture are described below.

### *Symbols*

Symbol is sometimes used in a very broad sense as synonymous with culture. However, it can be defined as any object, sign, gesture, act or linguistic formation that is conventionally accepted as conveying meanings and emotions. Using this definition accounting information is clearly a form of symbol: 'Accounting is one of the major formal sets of symbols available to organizational actors for ordering and interpreting their experiences' (Boland & Pondy, 1983). However, this is a rather broad interpretation of the nature of symbols that may be a more appropriate description of accounting as a language. A narrower definition of symbols emphasises that they stand for, or signify something other than their linguistic meaning. It is argued that accounting information is used as an attempt to demonstrate the rationality and legitimacy of organisations (Wildavsky, 1976; Meyer & Rowan, 1977; Burchell *et al.*, 1980; Feldman & March, 1981; Boland & Pondy, 1983; Meyer, 1983; Berry *et al.*, 1985).

This is a key factor in the study of accounting as symbols. Corporate annual reports are used as a means of demonstrating the rationality and legitimacy of organisations in two main ways. First they communicate information about managerial efficiency and the quality of financial control. It is important to appreciate that this is not intended to suggest that such information performs a purely technical function or is neutral. Developments in accounting principles and practices give rise to particular conceptions of organisational performance (Meyer & Rowan, 1977; Burchell *et al.*, 1980). Organisations which adopt such practices, and systematically gather, use and provide vast amounts of information, give the appearance of competence and demonstrate intelligent choice (Feldman & March, 1981).

The second main way in which corporate annual reports are used to demonstrate rationality and legitimacy is by communicating information that supposedly reflects the organisation's awareness of its responsibilities to society. Such information seeks to show that the enterprise has institutionalised those values and beliefs which are prevalent in society concerning its responsibilities to employees, impact on the community, etc. It also represents an attempt to establish how vital the organisation is to society. Accounting information helps create a shared interpretation of reality, in particular, what responsibilities the organisation has to society.

The postal questionnaire used to measure the PASC is shown in Appendix A. Questions 1 and 2 measure the symbolic element of culture and are designed to cover the two main ways in which corporate annual reports are used to demonstrate rationality and legitimacy as described above. The first question concerns the extent to which published accounts are intended to communicate information about managerial efficiency and the quality of financial control. This is a measure of the symbolic element of culture in that such information is used to give the appearance of competent management (i.e. rationality) and economic stability (i.e. legitimacy) to the providers of finance. The phrases 'published accounts', 'managerial efficiency and the quality of financial control' in the question were intended to focus the respondents' attention on the use of financial accounting information to evaluate the competence of management in general and the importance which they place on financial stability in particular. It was hoped that respondents would differentiate: (a) published accounts from annual reports; and (b) this function of annual reports from others such as stewardship, evaluating the performance of the entity, etc.

The second question concerns the extent to which other parts of a company's annual report are intended to communicate information about its social awareness. This is a measure of the symbolic element of culture since such information is used to give the appearance of an enlightened reasonable management (i.e. rationality) which recognises its responsibilities to employees and the community, and thus constitutes a progressive employer (i.e. legitimacy).

### *Language*

Language is often presented in the accounting literature as a form of symbol. This stems from the idea that both provide a means of ordering and interpreting human experience by creating shared meanings and values. For example, Boland & Pondy (1983) observe that 'accounting is one of the major formal sets of symbols available to organizational actors for ordering and interpreting their experiences'. Similarly Cooper (1981) argues that organisations develop a coding scheme or language to sustain a sense of social order and a value system, and that internal accounting systems provide an important means by which a system of shared meanings is sustained by recording what 'really' happened.

Language as an element of culture can be distinguished from symbols in terms of differences in their roles in accounting. As explained earlier, the symbolic nature of accounting information refers to its use as a device for demonstrating the rationality and legitimacy of organisations. However, accounting as a language provides a means of discourse, debate, negotiation, and achieving consensus. According to Hayes (1983), the complexity and imprecision of accounting language can explain different perceptions of the world and aid in their modification.

Uncertainty as to the meaning of accounting numbers, what they represent and how they can be interpreted facilitates negotiation, discussion and arrival at a consensus. Negotiation over meaning is an essential part of negotiating a common reality or understanding of organisation. This contrasts with the view of Cooper (1981) above which implies that accounting imposes a particular conception of reality. A similar distinction is made by Burchell *et al.* (1980) who argue that by influencing the accepted language of negotiation and debate, accounting systems can help to shape what is regarded as problematic, what can be deemed a credible solution, and the criteria which are used in their selection. However, the consequences which accounting systems have cannot be considered to be simple reflections of the interests which might have given rise to their creation. Rather they become mechanisms around which interests are negotiated, counter claims are articulated and political processes explicated. They may influence the language but they can rarely exclusively influence its outcomes (Burchell *et al.*, 1980).

To assert that accounting is the language of business is too much of a generalisation but clearly some organisations use language which is predominantly financial whereas others make less use of accounting measures. There are other 'languages of business' that can and are used in organisations for planning and performance evaluation. These are the languages of disciplines such as sales and marketing, production engineering, etc. For example, forecasting techniques are often more highly developed in sales than accounting. Production engineers talk in terms of down-time whereas accountants use measures of efficiency such as idle time variances. Question 3 and 4 of the postal questionnaire shown in Appendix A measure the language element of culture. As discussed above, Question 3 is designed to measure the extent to which organisations use accounting as a language in planning and co-ordinating their activities. Question 4 is intended to measure the extent to which organisations use accounting as a language in reporting performance as reflected by the frequency of exposure to such information. Although it is not generally accepted accounting terminology, the phrase 'internal profit reports' was used in order to encompass all forms of internal accounting systems. The alternatives such as management accounts, variance analysis statements, etc. were rejected because they may not be perceived as relevant to the non-manufacturing businesses in the survey. It was also thought that this phrase provided a uniform measure since it explicitly refers to reports which contain a figure of profit. None of the respondents in either the pilot study or the main survey mentioned this as being ambiguous.

### *Ideology*

Ideology is sometimes used in a rather loose sense in the accounting literature, and often linked with symbols and the legitimisation of prevailing political arrangements and vested interests. It can be defined as a set of ideas and beliefs about the rightness of certain social arrangements and actions (Pettigrew, 1979). There are numerous such beliefs in organisations and accounting. However, an important part of this definition of ideology concerns these beliefs forming a tightly or loosely related set which provide the basis for an economic, political or social system. Thus ideology has been associated with doctrines such as classical management theory, the human relations school, Marxism, political economy and marginalism (Tinker, 1980).

Given that accounting is intended to facilitate resource allocation and income distribution decisions (e.g. capital maintenance and dividend policy), it follows that these are major considerations in the study of accounting as an ideology. It has therefore been suggested that the ideological role of accounting may be seen in terms of which interests are bolstered, and which interests are undermined by the accounting measures an organisation uses, particularly in situations of economic and political conflict (Cooper & Sherer, 1984).

Questions 5 and 6 of the postal questionnaire shown in Appendix A measure the ideology element of culture. These are designed to measure the extent to which accounting information performs an ideological role in income distribution decisions and situations of conflict as discussed above. They are intended to cover the two main providers of economic resources (and social classes with conflicting interests), namely shareholders and employees, and the two principal contentious issues relating to their rewards, that is, dividend policy and wage claims. Thus Question 5 is a measure of the ideology element of culture in that it concerns the use of financial statements to justify a given distribution of rewards (or the lack of such rewards) to a particular interest group. Similarly Question 6 is a measure of the ideology element of culture since this quantifies the extent to which accounting information is used as a means of promoting certain vested interests (i.e. shareholders) while undermining others (i.e. labour) in industrial disputes (as proposed by Cooper & Sherer, 1984 above).

Question 5 relates to half-yearly results and interim dividends rather than annual results and final dividends because the former is more flexible and thus provides management with greater discretion. The flexibility includes half-yearly results not being audited, relatively few disclosure requirements, and the likelihood that interim dividends are less susceptible to stock market expectations in much the same way as wage claims referred to in Question 6. In comparison, final dividends have been shown to be heavily influenced by the annual results (Fama & Babiak, 1968).

### *Ritual*

There is considerable conceptual confusion in the accounting literature relating to the nature of rituals which are frequently not differentiated from symbols and myths. Ritual can be defined as any action that follows a set pattern and expresses meaning through the use of symbols. This may therefore be taken to include magic, witchcraft and ceremony. Using this definition all financial and management accounting techniques and practices are rituals. However, the accounting literature has focused mainly on budgeting as a ritual (Wildavsky, 1976; Gambling, 1977; Boland & Pondy, 1983).

Much of the confusion in the accounting literature stems from attributing the same function to symbols, rituals, and myths. One way of distinguishing rituals from symbols and myths is in terms of the ceremonial nature of rituals, and the functions these perform. A key feature of ceremonies is their use in influencing states of nature and the outcome of events (e.g. rain-dances, fertility rites, etc). Furthermore, ceremonies are frequently held prior to some important action or decision. A well documented example of accounting as a ritual is the use of capital budgeting techniques. Another is the use of cost-based models for fixing product prices. Like capital budgeting techniques these look factual and precise, and are more defensible than other methods of pricing when a firm is subject to public or government scrutiny (Oxenfeldt & Baxter, 1961). The important point about accounting as a ritual is that it provides a means of absorbing uncertainty, acts as an 'answer machine', allows past decisions to be rationalised and justified, and provides retrospective understanding of actions (Gambling, 1977; Burchell *et al.*, 1980).

Questions 7 and 8 of the postal questionnaire shown in Appendix A measure the ritual element of culture. These are designed to measure the extent to which accounting methods and techniques perform a ritual function as reflected by the amount of influence they have on the major decisions described above. Question 7 relates to the importance attached to capital budgeting criteria relative to qualitative considerations in investment decisions. This is a measure of the ritual element of culture in that these techniques are ceremonial in nature (i.e. follow a set pattern), occur prior to some important decision and are intended to act as an 'answer machine' (Burchell *et al.*, 1980). Question 8 concerns the extent to which cost data (i.e. cost plus pricing) influence the selling price of a company's products. This is a measure of the ritual element of culture for the same reasons as those given above in the case of Question 7. It involves a well-defined sequence of procedures, is intended to influence the outcome of future events and provides a means of absorbing uncertainty (Gambling, 1977).

### *Myth*

Myth is often used in a rather loose sense in the accounting literature and sometimes as synonymous with symbol. It can be defined as a narrative account of events that contains religious or supernatural ideas. Sociologists have extended this to include narratives that have a 'sacred' quality (Pettigrew, 1979) or are based on institutionalised rules (Meyer & Rowan, 1977). It is argued that in modern societies accountants have a priestly status (Gambling, 1978; Earl, 1983) which arises from the increasing institutionalisation of the accounting craft at both the organisational and societal levels (Burchell *et al.*, 1980).

Accounting is also said to function as a myth because it gives the appearance of rationality and legitimacy:

> Maintaining a clear rational accounting, in any organization, involves a great many fictions . . ; accounting structures are myths . . ; they describe the organization as bounded and unified, as rational in technology, as well-controlled and as attaining clear purposes . . ; and they legitimate the organization with the controlling external environment (Meyer, 1983).

However, this interpretation of how accounting functions as a myth is inconsistent with other literature that describes 'giving the appearance of rationality and legitimacy' as a function of information as symbol (Feldman & March, 1981).

There is thus a need to distinguish myths from symbols and rituals. Given that ritual has been described above as a characteristic of planning, and myths as narratives of events, accounting can be said to function as myth by providing an explanation of past events in the form of financial statements and performance reports. The mythical nature of these arises from institutionalised rules about 'proper' accounting principles, the arbitrary nature of cost allocations, etc. (Boland, 1982). Crises and problems occur when these myths are questioned or exposed.

Questions 9 and 10 of the postal questionnaire shown in Appendix A measure the myth element of culture. Question 9 is designed to ascertain the extent to which accounting reports perform a mythical function as reflected by the emphasis placed on accounting measures in performance evaluation. As discussed above, the mythical nature of this arises from variances providing an institutionalised explanation of past events. Question 10 is also designed to ascertain the emphasis on accounting measures in performance appraisal by reference to styles of evaluation. Govindarajan (1984) argues that reward systems which are 'formula-based' and use financial measures are analogous to a 'budget constrained' style of evaluation. Furthermore, there is nothing more likely to sustain and perpetuate myths than linking them with rewards and sanctions.

## Dependent variables and hypotheses

Six dependent variables were tested. These consist of: (1) the choice between expensing or capitalising development expenditure; (2) the choice between the immediate write-off of goodwill against realised reserves or amortisation in arriving at the profit on ordinary activities; (3) the methods used to calculate the cost of stocks and work in progress; (4) the publication of a statement of the impact of price changes on the profit and net operating assets (or full Current Cost or Price-Level Adjusted Accounts) in the annual report; (5) the publication of a statement of value added in the annual report; (6) the distribution of an employee report.

The selection of the dependent variables was guided by a number of considerations. The first was that they should include both measurement and disclosure practices. A second consideration was that the variables should be of some significance. The third consideration was comparability with previous research. A fourth consideration was that the disclosure practices tested should be both relatively innovative and relevant to a number of different groups of potential users of annual reports. The publication of a statement of the impact of price changes seemed an ideal choice given the controversy surrounding this subject and that SSAP16 (ASC, 1980) was no longer mandatory at the time the study was undertaken. The last two dependent variables have an obvious association with different groups of users.

In broad terms, the theoretical framework described earlier suggests that companies with a strong professional accounting sub-culture (PASC) tend to adopt 'proper' or 'conventional' measurement practices, disclose more information and utilise innovative reporting techniques. Each of these is discussed below.

The idea that companies with a strong PASC tend to adopt 'proper' measurement practices arises from the main elements of organisational culture discussed above. As a symbol the use of 'proper' measurement practices allows organisations to demonstrate a seemingly legitimate choice of accounting methods. As a language the adoption of 'conventional' measurement practices creates shared meanings and values, and acts as a means of achieving consensus amongst the various participants. The use of 'proper' measurement practices also enhances the ideological role of accounting by allowing companies to claim conformity with best accounting principles in debates over resource allocation, income distribution, and situations of industrial conflict. As a ritual the adoption of 'proper' measurement practices absorbs uncertainty by generating data that is conventionally accepted as accurate and more defensible in situations of economic conflict. Finally, the use of 'proper' measurement practices functions as a myth by providing an institutionalised account of past events despite its arbitrary nature.

This means that it is not possible to generalise about choices of accounting methods such as capitalisation versus expensing of costs, etc. Each has to be considered separately. In the case of development expenditure, SSAP13 (ASC, 1977) states that development expenditure should normally be expensed in the year incurred unless the potential future benefits can be assessed with reasonable certainty, in which case it may be deferred to be matched against the future revenue. There is thus an explicit assumption that the 'proper' or 'conventional' treatment of development expenditure is to expense it in the year incurred. This generates the following hypothesis:

*Hypothesis 1: Companies with a strong PASC tend to expense development expenditure whereas those companies with a weak PASC capitalise these costs.*

In the case of goodwill, SSAP22 (ASC, 1984) requires that purchased goodwill should normally be eliminated from the accounts immediately on acquisition against realised reserves. However, it may be amortised over its useful economic life through the profit and loss account in arriving at the profit or loss on ordinary activities. There is thus an explicit assumption that the 'proper' or 'conventional' treatment of goodwill is to write it off immediately. This generates the following hypothesis:

*Hypothesis 2: Companies with a strong PASC tend to write off goodwill against reserves whereas those companies with a weak PASC amortise it through the profit & loss account.*

In the case of stocks, SSAP9 (ASC, 1975) states that the method of calculating the cost of stocks should provide the fairest practicable approximation to actual cost. The methods favoured by SSAP9 consist of FIFO, average cost, unit cost, standard cost and retail prices less the normal gross profit margin. In contrast the base stock and LIFO methods are specifically rejected because it is said that they do not usually bear a reasonable relationship to actual cost. There is thus an explicit assumption that the 'proper' methods of calculating the cost of stocks comprise the first five mentioned above. This generates the following hypothesis:

*Hypothesis 3: Companies with a strong PASC tend to calculate the cost of stocks using FIFO, retail prices, average, unit or standard cost whereas those companies with a weak PASC use the base stock or LIFO methods.*

The tendency for companies with a PASC to disclose more information and utilise innovative techniques also arises from the main elements of organisational culture discussed above. As a symbol it provides organisations with a means of demonstrating their apparent superior ability systematically to gather, handle and make sense of larger amounts of information. It also symbolises the seemingly progressive nature of management in the adoption of new techniques and recognition of changes in social beliefs (e.g. about the objectives of financial statements). This gives the appearance of competence and management awareness of social responsibilities. The disclosure of additional financial information also often increases the conceptual content of accounting as a language and thus provides further scope for debate and negotiation. For example, a statement of the impact of price changes involves alternative concepts of capital maintenance, profit, asset valuation, etc. It further performs an ideological role in that new techniques and voluntary disclosure provide considerable scope as a means of promoting particular vested interests and related institutional arrangements (e.g. value added statements, employee reports, etc). As a ritual the disclosure of additional information and use of innovative techniques provides a potentially extremely potent means of influencing states of nature and the outcome of events particularly since such practices are not usually governed by legislation or accounting standards (e.g. statements of the impact of price changes, value added statements, etc). It also reinforces and creates new myths by providing additional explanations of past events, further interpretations of what 'really' happened, and new concepts of organisational performance. For example, value added statements provide an alternative explanation of the firm's activities in terms of its role in the creation of wealth, and promote a view of the enterprise as a collective with common interests.

The hypotheses tested in this study relating to the voluntary disclosure of additional information can therefore be summarised as follows:

*Hypothesis 4: Companies with a strong PASC tend to publish a statement of the impact of price changes on the profit and net operating assets in their annual report whereas those companies with a weak PASC do not.*

**Exhibit 2**
**A Simple Model for Analysing Organisational Culture**

*Sub-Cultures*

| *Elements of Culture* | Accounting | Sales | Production | Purchasing | Personnel |
|---|---|---|---|---|---|
| Symbol | | | | | |
| Language | | | | | |
| Ideology | | | | | |
| Ritual | | | | | |
| Myth | | | | | |

*Hypothesis 5: Companies with a strong PASC tend to publish a statement of value added in their annual report whereas those companies with a weak PASC do not.*

*Hypothesis 6: Companies with a strong PASC tend to distribute an employee report whereas those companies with a weak PASC do not.*

These hypotheses give rise to two fundamental apparent contradictions that need to be addressed. First if organisations with a PASC favour 'proper' measurement practices and greater disclosure, why are so many companies opposed to accounting standards such as SSAP16 (ASC, 1980)? Second, why are the above choices of accounting methods associated with a PASC rather than other organisational sub-cultures such as those shown in Exhibit 2? Each of these is discussed below.

The answer to the first question is that, although companies with a PASC favour greater disclosure and innovative reporting practices, it does not follow that they would want these to become the subject of legislation or an accounting standard. Indeed the theoretical framework in this paper suggests the reverse. Disclosure which is required by law or the ASC has little symbolic value as a means of demonstrating the organisation's superior quality of information or a progressive management vis-à-vis other companies. Similarly it has little value as a ritual because there is limited scope for creative accounting. Companies with a PASC are therefore only likely to favour greater disclosure and innovative reporting practices where these are voluntary.

As regards the second question, the theoretical framework shown in Exhibit 2 could be taken to generate plausible alternative hypotheses such as that companies with a strong professional personnel/industrial relations (or production) sub-culture are more likely to publish a statement of value added and an employee report. This is something one would wish to test in a further study. However, the reasons for including them in the present study as associated with a PASC are twofold. First the current research focuses on a PASC, and these are the only forms of purely voluntary disclosure that are both substantial and common in practice without being universal. Second, statements of value added from a part of the annual report and employee reports are also often sent to shareholders with the annual report, presumably as surrogate simplified accounts. This suggests that these may be intended to perform symbolic, ritual and mythical functions aimed at a variety of groups of potential users of corporate reports. Thus companies with a strong PASC are likely to have at least as much incentive as those with a professional personnel sub-culture to publish these two statements.

Finally, some readers may be left with the impression that the independent and dependent variables are essentially the same. This is not so. The difference is that the independent variable as reflected in the contents of the questionnaire relates to the *use* of accounting information (as a symbol, etc.) whereas the dependent variables refer to the selection or *choice* of accounting methods. Furthermore, the hypotheses are not fundamentally different from conventional thinking since they postulate that the use of accounting information (in performing a cultural/social rather than a purely economic function) influences the choice of reporting practices.

## Research method

### *Sample and Method of Data Collection*

The sample comprises those companies in *The Times 1000 1985–86* whose shares are listed on The London Stock Exchange. *The Times 1000 1985–86* is made up of the 1,000 largest UK industrial companies ranked by turnover and includes unquoted companies (most of which are wholly-owned subsidiaries of foreign companies), nationalised industries and several non-manufacturing and service industries. It excludes property companies, insurance companies, investment trusts, banks and similar financial institutions. The sample was confined to companies listed on The London Stock Exchange because some of the variables in the study are not relevant to unlisted companies. This produced a sample of 493 companies.

The data was collected by means of a postal questionnaire addressed to each company's finance director. This is shown in Appendix A. Prior to the main survey a pilot study was undertaken to ensure that the questions were relevant and understandable. This was sent to those unlisted companies ranked 501–600 in size. The responses led to some modification of the original questionnaire.

Postal questionnaires have a number of limitations and are often regarded as inferior to interviews in studies of management accounting systems. However, corporate reporting practices in the UK do not have the same amount of variety as management accounting systems. This means that cross-sectional studies necessitate a large sample, which tends to restrict feasible data collection methods to the use of postal questionnaires.

After one reminder letter, the number of usable replies received was 247 which amounts to 50% of the sample size. The relatively high response rate may be attributed to the shortness of the questionnaire, the ease with which it could be completed, and that the covering letter described the study as concerned with accounting standard setting and the problems associated therewith. In the vast majority of cases the questionnaire was completed by the finance director. In all other instances it was completed by a senior member of each company such as the chairman, company secretary, chief accountant, financial controller, etc. A significant number of questionnaires were returned uncompleted and in all of these cases the reason given was that the company had a policy of not completing questionnaires because of the demands on their time. There were also a few unusable replies where the respondents had failed to answer some questions for no apparent reason.

The two experimental conditions in respect of each dependent variable and the number of companies in each category is shown in Exhibit 3. Research expenditure has been specifically excluded from development expenditure because the Companies Act 1985 prohibits the former being capitalised. As described previously, the treatment of development expenditure, goodwill and stocks is prescribed by accounting standards. None of the other dependent variables was subject to legislative requirements or accounting standards at the time the study was undertaken. The number of companies that amortise goodwill is known to have declined markedly over the last few years for no obvious reason. However, the extensive nature of this reduction was not apparent until the responses to the questionnaire had been received. The number of companies that use the base stock or LIFO methods of calculating the cost of stocks is small because these are disallowed by SSAP9.

### *Measures*

Organisational culture was measured by ten questions which comprise two relating to each of the five elements of culture described above. Each question had a 7-point scale consisting of literal descriptions representing an increasing profes-

**Exhibit 3**
## Sample Data for Dependent Variables

### *Development Expenditure*

| | | |
|---|---|---|
| Group A—All expensed in year incurred | | 149 |
| Group B—Some deferred and amortised | | 25 |
| Omitted—No material development expenditure | | 73 |
| | | 247 |

### *Goodwill*

| | | |
|---|---|---|
| Group A—Immediate write-off against realised reserves | | 195 |
| Group B—Amortisation through profit & loss account | | 5 |
| Omitted—Other (e.g. capital reduction) | 7 | |
| —No goodwill | 40 | 47 |
| | | 247 |

### *Methods of Calculating the Cost of Stocks and Work in Progress*

| | | |
|---|---|---|
| Group A—FIFO | 90 | |
| —Retail prices | 14 | |
| —Average cost | 32 | |
| —Unit or standard cost | 27 | 163 |
| Group B—Base stock | 4 | |
| —LIFO | 4 | 8 |
| Omitted—More than one method | 64 | |
| —No stocks | 12 | 76 |
| | | 247 |

### *Statement of the Impact of Price Changes*

| | |
|---|---|
| Group A—Disclosed | 21 |
| Group B—Not disclosed | 226 |
| | 247 |

### *Statement of Value Added*

| | |
|---|---|
| Group A—Disclosed | 44 |
| Group B—Not disclosed | 203 |
| | 247 |

### *Employee Report*

| | |
|---|---|
| Group A—Disclosed | 118 |
| Group B—Not disclosed | 129 |
| | 247 |

**Exhibit 4**
**Factor Analysis of PASC Questionnaire**

| Variables | | Mean | Standard deviation | Factor loading |
|---|---|---|---|---|
| 1. | Managerial efficiency and quality of financial control | 4.45 | 0.99 | 0.50 |
| 2. | Awareness of responsibilities to employees and community | 3.93 | 1.10 | 0.52 |
| 3. | Accounting used in planning and co-ordinating activities | 5.37 | 0.73 | 0.50 |
| 4. | Frequency of reporting | 5.01 | 0.73 | 0.22 |
| 5. | Influence of accounting data on dividend policy | 4.34 | 1.11 | 0.16 |
| 6. | Accounting information used in collective bargaining | 3.56 | 1.39 | 0.54 |
| 7. | Importance of capital budgeting in investment decisions | 4.90 | 1.05 | 0.44 |
| 8. | Importance of cost data in pricing decisions | 4.94 | 1.13 | 0.19 |
| 9. | Style of evaluation | 5.13 | 0.84 | 0.66 |
| 10. | Accounting measures linked with rewards and sanctions | 4.73 | 1.07 | 0.50 |

sional accounting sub-culture (see Appendix A). The responses to each question were assigned a numerical rating on a scale of one to seven.

Construct validity for this measure was assessed by means of factor analysis. This took the form of principal factoring with iteration. Computations were carried out using the Statistical Package for the Social Sciences (SPSS) computer program. The results of the factor analysis are shown in Exhibit 4. These yielded one factor with an eigenvalue greater than one. This factor explained 56% of the variance. A single scale was therefore constructed by aggregating the responses to each question and computing a simple average. Summary statistics for this variable are as follows: mean = 4.635; standard deviation = 0.500; range = 3.100 – 5.900.

Internal consistency reliability for this measure was assessed by means of Cronbach's alpha. This produced a co-efficient of 0.64 which meets Nunnally's (1967) minimum standard of 0.50 for exploratory research.

### *Significance Tests*

The hypotheses were tested using the Mann Whitney U Test because the data relating to the independent variable was not known to have a normal distribution. Since the hypotheses include a prediction of the direction of the results, a one-tailed test was deemed appropriate. Computations were carried out using the SPSS computer program.

## Results and analysis

The results of the Mann Whitney U Test are shown in Exhibit 5. All of the significant variables are in the direction predicted.

Inspection of the results for development expenditure show that this is significant at the 0.10 level. That is, companies with a strong PASC tend to expense development expenditure whereas those with a weak PASC capitalise these costs. Previous research by Thomas (1986) indicates that small companies expense development costs whereas large companies capitalise these costs. In contrast, Daley & Vigeland (1983) found that firms which capitalise R&D tend to be smaller in size. This suggests that organisational culture may be an intervening variable.

The results for goodwill are significant at the 0.01 level. That is, companies with a strong PASC tend to write off goodwill against reserves whereas those with a weak PASC amortise it through the profit & loss account. Previous research by Thomas (1986) failed to find any significant association between the treatment of goodwill and environmental uncertainty, type of technology or organisation size. Given the small number of companies in this study that amortise goodwill, the findings must be treated with caution.

The results for stocks are not significant. Previous research by Thomas (1986) suggests that the method of calculating the cost of stocks is influenced by environmental uncertainty and organisation size. However, this is not strictly comparable

**Exhibit 5**
**Summary of Results of Mann Whitney U Test**

| | | *U value* | *Z score* |
|---|---|---|---|
| 1. | Development expenditure | 1563.5 | −1.2857c |
| 2. | Goodwill | 150 | −2.6465a |
| 3. | Stocks | 540.5 | −0.8175 |
| 4. | Statement of the impact of price changes | 1934 | −1.4046c |
| 5. | Statement of value added | 3362.5 | −2.5736a |
| 6. | Employee report | 7493 | −0.2108 |

a = Significant at $p < 0.01$
b = Significant at $p < 0.05$
c = Significant at $p < 0.10$

with the present study because the classification of the methods of calculating the cost of stocks is different.

Inspection of the findings relating to the disclosure of a statement of the impact of price changes in annual reports shows that this is significant at the 0.10 level. That is, companies with a strong PASC tend to publish a statement of the impact of price changes whereas those with a weak PASC do not. Previous research by Archer & Steele (1983) indicates that large companies are more likely to provide a statement of the impact of price changes than small companies. The question of consistency between this and the results of the present study is discussed in the next section.

The findings in respect of the disclosure of a statement of value added in annual reports are highly significant ($p < 0.01$). That is, companies with a strong PASC tend to publish a statement of value added whereas those with a weak PASC do not. This appears to provide strong evidence concerning the relevance of a PASC particularly as only two of the questions in the survey have any connection with users that may be interested in value added. Previous research by Gray & Maunders (1980) indicates that large companies are more likely to provide a statement of value added than small companies. The question of consistency between this and the results of the present study is discussed in the next section.

The findings relating to the distribution of an employee report are not significant. This was disappointing but may be explained by one of the limitations of the study. Several respondents observed that the decision whether to prepare an employee report was made at subsidiary level rather than by the holding company to whom the questionnaire was addressed. Other respondents pointed out that financial information was given to employees in the company magazine. The data relating to the disclosure of employee reports may therefore be suspect. Previous research by Marsh & Hussey (1978) indicates that large companies are more likely to distribute an employee report than small companies. The question of consistency between this and the findings of the present study is discussed in the next section.

## Implications, limitations and future research

The results of this study suggest that the concept of a PASC could be a useful theoretical construct. There is also some evidence that it may be an intervening variable. This would explain the inconsistencies in previous research findings on corporate reporting practices and the design of MAS.

The measures of construct validity and internal reliability indicate that the design of the postal questionnaire was acceptable. However, the responses received suggest that the questions should ideally be more finely tuned, and greater consideration given to the selection of the sample. The questions used in this study are rather general, and several respondents pointed out that there is considerable diversity of practices amongst subsidiaries in large groups of companies. One possibility for future research would be to construct a more detailed questionnaire aimed at subsidiaries or unlisted companies and to examine whether this produced factors which correspond to the elements of organisational culture used in this study.

Another potentially important limitation of postal questionnaires concerns differences in the perceptions of employees at various levels in an organisation. A few of the companies in the survey completed two copies of the questionnaire by mistake (duplicates were sent with the reminder letter and marked 'copy'). These contained differences between respondents in the same organisation. Most studies of this sort are usually based on the premise that the perceptions of key decision-makers is the main factor affecting the design of accounting information systems. This may be a reasonable assumption in the case of external accounting systems given that the finance director and chief accountant are likely to have a major influence on decisions relating to corporate reporting practices. However, it is perhaps more problematic with regard to MAS. This is something that needs to be investigated further in the context of organisations being multicultural.

The results relating to the treatment of development expenditure and goodwill are encouraging but require further research. The findings for development expenditure are not highly significant, and the number of companies that amortise goodwill is extremely low. A potentially illuminating piece of future research would be to conduct an in-depth analysis of the few companies that amortise goodwill and use other unorthodox accounting methods.

The results in respect of the methods of calculating the cost of stocks are disappointing. A possible reason for this is that the 'proper' or 'conventional' treatment of fungible stocks is not as clear cut as in the case of development expenditure and goodwill. Methods such as retail prices and standard cost are only regarded as acceptable by SSAP9 to the extent that they constitute 'the only practical method of arriving at a figure which approximates to cost' and are 'reviewed frequently'. Similarly, although the base stock and LIFO methods are specifically rejected by SSAP9, these are permissible under the Companies Act 1985.

The findings relating to the publication of a statement of the impact of price changes and value added provide the strongest support for the idea that the voluntary disclosure of additional information is influenced by whether a company has a strong PASC. However, the results for the disclosure of a statement of the impact of price changes is not highly significant and thus requires further investigation.

A possible explanation of the poor results in respect of the distribution of an employee report was given in the previous section. Another possible reason is that, unlike the statements of the impact of price changes and value added (for which the findings were significant), employee reports do not form a part of the annual report and are not intended for use by shareholders, investment analysts, etc. This may seem a trivial distinction. However, in their comments on the questionnaire a significant number of senior executives of smaller companies, without being prompted, stated that annual reports were a 'public relations exercise' aimed at maximising their 'price-earnings ratio'. This clearly supports the ideas discussed earlier relating to the role of accounting as a symbol and ritual. However, it suggests that the main focus of attention in companies with a strong PASC is providers of finance rather than employees. It also provides a further reason for testing the alternative hypothesis that companies with a strong professional personnel/industrial relations sub-culture are more likely to distribute an employee report.

Previous research indicates that the publication of a statement of the impact of price changes, value added, and employee reports are influenced by organisation size (Archer & Steele, 1983; Gray & Maunders, 1980; Marsh & Hussey, 1978). This raises the question whether the results of the present study are consistent with previous findings. The answer may lie in the existence of a relationship between size and a PASC. Large companies are perhaps more likely to have a strong PASC in the sense that they tend to use accounting as a symbol, language, ritual, etc. This has a number of potential theoretical implications. It may, for example, provide a bridge between studies of culture on the one hand, and those based on agency theory and the relative income effects of choices of accounting methods on the other. This can be seen in the use of accounting as a symbol by large companies to reduce political costs and avoid regulation by external agencies. Two contrasting examples of this are a study at the National Coal Board (NCB) by Berry *et al.* (1985) and the research of Watts & Zimmerman (1978):

> The present system of financial control [at the NCB] has in the past been adequate to legitimate managerial actions to government and external bodies, giving an appearance of. . good housekeeping and efficiency (Berry *et al.*, 1985). To counter these potential government intrusions, corporations employ a number of devices, such as. . selection of accounting procedures to minimize reported earnings (Watts & Zimmerman, 1978).

Allowing for the fact that the NCB was struggling to survive at this time, these two quotations may be interpreted as essentially containing the same proposition. That is, large business enterprises tend to have a strong PASC which is used as a symbol to reduce political costs and external intervention.

One of the main implications of this study is that greater attention needs to be given to organisational culture in research into management's choice of accounting methods. Both contingency theories of management accounting, and those based on agency theory and the relative income effects of accounting methods, assume there is a direct relationship between environmental variables and the attributes of accounting systems. This is probably a gross oversimplification. Recent research suggests that this relationship may be influenced by the existence of internal variables such as leadership style, management philosophy, etc. These can be conceptualised in terms of the extent to which organisations have a PASC. The present study indicates that this may influence management's choice of certain measurement practices and forms of voluntary disclosure of additional information.

## Summary and conclusions

There is already considerable empirical evidence that environmental variables influence management's choice of external accounting methods and affect the design of MAS. However, this contains a number of inconsistencies. Recent research suggests that these may be due to differences in leadership style and management philosophy. Similarly there is some empirical evidence which indicates that the choice of corporate reporting practices is influenced by institutionalised rules. The paper therefore proposed a simple model of the effect of the socio-economic environment on the design of MAS and CFRS in which organisational culture constitutes an intervening variable.

One of the main aims of this research was to provide a clarification of the concept of organisational culture. It has been suggested that culture comprises five main elements: symbols, language, ideology, rituals and myths. These were examined in some depth in order to demonstrate that enterprises can be conceptualised in terms of the extent to which they have what might be called a professional accounting subculture (PASC).

The other main aim of this research was to ascertain whether organisational culture influences the choice of corporate financial reporting practices. Six dependent variables were tested which comprise three types of measurement practices and three forms of voluntary disclosure of additional information. The measurement practices consist of the treatment of development expenditure, goodwill and stocks. The disclosure practices comprise statements of the impact of price changes and value added, and employee reports.

The results show that companies with a strong PASC tend to expense development expenditure whereas those with a weak PASC capitalise these costs. Similarly companies with a strong PASC tend to write off goodwill against reserves whereas those with a weak PASC amortise it through the profit & loss account. No significant results emerged in respect of the methods used to calculate the cost of stocks. The findings also indicate that companies with a strong PASC tend to publish a statement of the impact of price changes whereas those with a weak PASC do not. Similarly companies with a strong PASC tend to publish a statement of value added whereas those with a weak PASC do not. No significant results emerged in respect of the distribution of employee reports.

The findings of this study suggest that the concept of a PASC could be a useful theoretical construct. There is also some evidence that it may be an intervening variable. This would explain the inconsistencies in previous research findings on the choice of corporate reporting practices and the design of MAS. Greater attention therefore needs to be given to organisational culture in research into management's choice of accounting methods.

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# Appendix A
# Questionnaire on Organisational Culture

1 To what extent do you regard your organisation's published accounts as a means of communicating information about managerial efficiency and the quality of financial control?

| Not used | Very little | Little | Moderate use | High | Very high | Exclusive use |
|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

2 To what extent do you regard your organisation's annual report and other financial statements as a means of communicating information about the company's awareness of its responsibilities to employees and impact on the community?

| Not used | Very little | Little | Moderate use | High | Very high | Exclusive use |
|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

3 To what extent is accounting information used in your organisation as a means of planning, implementing corporate policy and co-ordinating activities?

| Not used | Very little | Little | Moderate use | High | Very high | Exclusive use |
|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

4 How frequently does your organisation produce internal profit reports?

| Annually | Half yearly | Quarterly | Bi-monthly | Monthly | Fortnightly | Weekly |
|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

5 To what extent does your organisation's half-yearly results influence management's decision on the interim dividend?

| | | | | | | |
|---|---|---|---|---|---|---|
| No influence | Very little | Little | Moderate influence | High | Very high | Exclusive influence |
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

6 To what extent is accounting information used by your organisation's management in collective bargaining relating to wage claims and redundancies?

| | | | | | | |
|---|---|---|---|---|---|---|
| Not used | Very little | Little | Moderate use | High | Very high | Exclusive use |
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

7 How much importance does your organisation attach to capital budgeting criteria, such as the payback period or rate of return, vis-à-vis qualitative considerations in investment decisions?

| | | | | | | |
|---|---|---|---|---|---|---|
| No importance | Very little | Little | Moderate importance | High | Very high | Extensive importance |
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

8 How much importance does your organisation attach to cost data in the final determination of product selling prices?

| | | | | | | |
|---|---|---|---|---|---|---|
| No importance | Very little | Little | Moderate importance | High | Very high | Extensive importance |
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

9 Which of the following best describes the style that is used in your organisation to evaluate the performance of managers in relation to budgets, standards and other financial targets?

| | | | | | | |
|---|---|---|---|---|---|---|
| Adherence not a priority | Adherence a very low priority | Adherence a low priority | Adherence a moderate priority | Adherence a high priority | Adherence a very high priority | Strict adherence expected |
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

10 To what extent are the accounting measures of performance that are used in your organisation perceived as being linked with rewards and sanctions such as salary increases, bonuses, promotion, dismissal, etc?

| | | | | | | |
|---|---|---|---|---|---|---|
| Not linked | Very little | Little | Moderate link | High | Very high | Definite link |
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

# Book Reviews

**The US Accounting Profession in the 1890s and Early 1900s.** *S. A. Zeff (ed.).* Garland Publishing, 1988. xxii + 585 pp. $70.

Although this volume is one of the 'never-before-published' titles in the Garland Foundations of Accounting series, this particular collection consists of eighteen items which have previously appeared in print, together with an original introduction by Zeff. The eighteen pieces are by fourteen authors, some of whom were practitioners and officers in the early US professional accountancy societies (e.g. James T. Anyon, Norman E. Webster, George Wilkinson and Ernest Reckitt), while others were or are academics (e.g. Mary E. Murphy, James Don Edwards, and Gary John Previts and Barbara Dubis Merino).

The stated purpose of the introduction to the collection is 'to place the authors of the articles and their contributions in a helpful perspective'; this is achieved by short biographical sketches. However, the introduction also includes useful lists of the published histories of: the state societies; the major American accountancy firms; and major accounting departments in state universities; together with a list of volumes dealing with the careers of leading accounting practitioners.

The contributions contained in this work are described in the introduction as of three kinds: contemporary accounts, recollections, and historical studies. The book is divided into two sections; the first, and by much the larger, entitled 'The Profession', consists of fourteen items, while the second, called 'Education and Examination', contains four articles. Most of the contributions are articles: the majority, seven in number, appeared in *The Accounting Review* between June 1927 and April 1955, two come from *The Journal of Accountancy* and one each from the *University of Illinois Bulletin*, *The Certified Public Accountant* and *The Arthur Young Journal*. Also included are two short monographs of reminiscences and, perhaps somewhat unusually, chapters from books on the development of the American accountancy profession.

The title may be a little misleading since it would suggest that the time period covered is the decade each side of 1900. One article takes as its starting point the date 1748 while another concludes in 1926; however the bulk of the material is concerned with the period approximately from 1880 to 1915.

The items cover *inter alia*: the first accounting practitioners and the work in which they engaged; the development of professional bodies, such as the formation of the American Association of Public Accountants (1886), the passing of the first CPA law in New York (1896), the founding of the early state societies, and the formation of the Federation of Societies of Public Accountants in the United States (1902); the literature then available; the state of auditing and the early development of accounting education.

In a collection of this kind it is somewhat difficult to organise the contributions in any logical order because of their differing content and the time periods covered. As is readily admitted by Zeff, there is a great deal of overlap and repetition; indeed, in some cases literally so since earlier material is often quoted verbatim in subsequent contributions. However, as one reads through the volume one gains a different perspective of the development of the American accountancy profession. The earlier papers are mostly by practitioners who were intimately involved in the earliest days of the profession (the earliest paper was originally published in 1904), while the later contributions are by academics who could stand back and see the earlier developments in a wider context (the latest contribution was first published in 1979). The earlier papers tend to be more descriptive and concerned with presenting facts, the later ones are more analytical.

As explained in the introduction to the book, Zeff's purpose in compiling it was to overcome 'the fragmented state of the literature on the early development of the US public accounting profession' and to provide a work which gathered 'in one place most of the writings that portray the early decades of the profession'. This objective has clearly been achieved. It is somewhat unlikely, though, that many people will read this book from cover to cover. Those interested in the development of the American profession are more likely, in the first instance, to turn to a more general work such as Gary John Previts and Barbara Dubis Merino's *A History of Accounting in America* (New York: Ronald/Wiley, 1979), chapters from which form one of the contributions in the work under review. The benefit of Zeff's editorship is in providing a work of source material to which reference can be made to elicit certain details on a particular feature of the profession's development. To this end, and especially given the repetition already mentioned above, it would have been most useful to have had an index to this work so as to ascertain differing views and perspectives on one topic.

In reviewing this work it is only natural to wonder whether a comparable compendium of articles could be collected together on the early development in the UK of the profession and of professional and academic education. If this is not possible then Zeff's work should provide ideas and encourage parallel studies to be researched by accounting historians in the British Isles.

As a point for reflection it is perhaps worth quoting one passage from an item originally published in 1969 by John L. Carey. This not only raises the question as to how and why the accountancy profession has developed differently in the UK and the US but also shows the link between the past and the present, and, as it happens, is of topical interest for both academics and practitioners alike:

> If the Association had been able to secure authority comparable to that conveyed by the English Institute's Royal Charter, it is quite likely that the apprenticeship system established by the English chartered accountants would have been imitated in the United States. In that event the teaching of accounting in colleges and universities might have been delayed for many years—until the apprenticeship system proved unworkable, as it certainly would have in this country, and indeed may ultimately prove to be in England (p. 404).

University of Kent at Canterbury Peter Boys

**T. E. Cooke.** *European Financial Reporting: Sweden.* Institute of Chartered Accountants in England and Wales, 1988. 210 pp. £15.95.

*European Financial Reporting: Sweden* is one of an ongoing series of books sponsored by the Research Board of the Institute of Chartered Accountants in England and Wales. Although the purpose of the book is to provide insight into Swedish accounting standards and practices for persons knowledgeable in British accounting practices, there are also numerous comparisons between Swedish and US accounting standards and practices.

The book comprises seven chapters and several appendices. It is an excellent reference book that can be used by academics and professionals alike. Teachers of international accounting classes will find the book useful as supplemental reading, especially in graduate seminars, and as the basis for lectures on European accounting.

Given the intense discussion in recent years on accounting harmonisation in Europe due to the EC 4th, 7th and 8th Directives, this book is an interesting contrast to EC countries on the forces involved in changing accounting standards and practices. Sweden, which is not a member of the EC, is influenced heavily by German accounting traditions as a natural consequence of historical trade and investment patterns. However, this heavily conservative and legal-based approach to accounting is being modified now by the US orientation to capital market disclosures, especially as the large Swedish companies are forced to gain access to international capital markets.

The book begins with a general introduction to the forces involved in developing accounting standards and practices in Sweden and is followed by a discussion of Swedish business organisations and the general business background in Sweden.

The next chapter discusses taxation issues, which is logical, given the heavy fiscal influence on Swedish accounting. Unlike the US and UK, Swedish tax law has a strong influence on financial reporting. Although statutory tax rates are rather high in Sweden, valuation and recognition principles in tax law tend to reduce income and, therefore, the effective tax rate. This is similar to the situation in other parts of Continental Europe.

Chapter 5 concentrates on the legislative and professional influences on accounting standards, as well as the nature of the accounting profession. The chapter outlines the major sources of influence on Swedish accounting: the government; major committees, such as the Accounting Standards Committee of the Swedish Institute of Authorised Accountants and the National Accounting Standards Board; and lobbying organisations representing groups such as labour unions, the employers' confederation, and the media. On the government side, the Companies Act 1975, the Accounting Act 1976, the 1981 Act on the Annual Reports of Certain Companies, and Tax Legislation are important sources of influence. Given that the law does not really refer to specific accounting standards, generally accepted accounting principles in Sweden tend to be those followed by the largest and most influential companies.

Also discussed in Chapter 5 are a number of external influences on Swedish accounting. As was mentioned earlier, many of the legal and accounting requirements in Sweden are similar to those of the Federal Republic of Germany. The move of Swedish multinationals into other capital markets has tended to improve the quality of disclosure. Rather than develop their own standards, the Swedes tend to look to the UK, the US, the International Accounting Standards Committee, and the OECD for guidance.

Chapter 6, 'The Survey of Accounts', analyses the annual reports of a relatively large sample of Swedish companies in order to provide a reference of corporate practices. Unlike previous studies which have concentrated on the largest listed companies that exhibit strong accounting and disclosure practices, this study provides information from 38 unlisted companies, 33 companies listed solely on the Stockholm Stock Exchange (SSE), and 19 companies listed on the SSE with at least one other overseas quotation. As one would expect, there is a significant difference in disclosure practices of the three categories of firms. The disclosure of the multiple listed companies is as good as can be found anywhere in the world. At the other extreme, the disclosure practices of the unlisted companies barely meet the provisions of the Accounting Act and the Companies Act.

The final chapter is a summary, and it also contains a number of interesting appendices: extracts from the accounts of Atlas Copco, a Swedish company with a high level of disclosure; a list and description of standards issued by the Swedish Institute of Authorised Public Accountants (FAR), which, unfortunately, are recommendations that do not have to be followed by Swedish companies; a list and description of standards issued by the Swedish Accounting Standards Board (BFN); examples of audit reports; a summary of the main differences in financial reporting between Sweden, and the UK and the US; a comparison in financial reporting between Sweden and other Scandinavian countries; a bibliography; a Swedish/English and English/Swedish glossary; and an index. The appendices comparing Swedish standards with those of other countries are especially helpful.

Brigham Young University — Lee Radebaugh

**Consolidated Financial Statements,** *K. J. Leo*, Australian Accounting Research Foundation, 1987. vi + 188 pp.

This discussion paper mixes discussions on theory with numerical illustrations of practice. The former are done well; the latter are in some cases unnecessarily detailed as illustrations of the former, and could already be found in dull textbooks.

As one would expect from an Australian writer, there are extensive references to writers, pronouncements and practice in other Anglo-Saxon countries. Even the EC Seventh Directive is referred to. It is unfortunate that the international aspects of the discussion paper will soon seem dated because of the UK's Companies Act 1989; revisions to SSAPs 14 and 22 and to IAS 3; and the promulgation of SFAS 94.

The paper's treatment of the theories which might be said to underlie consolidation practices is more extensive than in most articles or texts. It is also clear and convincing. However, the author's frequent reference to minority interests as 'liabilities', despite his acknowledgement of criticisms of this, is grating. Also, the discussion on foreign subsidiaries (p. 77) is sparse, naive and dated. For a country whose companies have more foreign subsidiaries than Australian companies have, the problem of uniform accounting policies would be more central and obvious.

The discussion paper has no preface or foreword, so it is not clear what it is trying to achieve. Nevertheless, it is a good exposition of theories and techniques relating to many aspects of consolidation.

University of Reading — Christopher Nobes

**Accounting & Management: Field Study Perspectives.** *William J. Bruns, Jr. and Robert S. Kaplan (eds.).* Harvard Business School Press, 1987, ix + 374 pp. $35.

According to the Introduction, 'This volume represents a major attempt to *understand* management accounting systems in actual organizations' (p. 2, emphasis added). However, this understanding appears to be derived from a conventional, and largely economic view of the nature of management accounting. The first sentence of the book appears thus: 'Management accounting creates information within the organizations to facilitate managers' decision and control processes' (p. 1). This managerial decision making perspective shapes much of the research reported in this book.

The book contains thirteen papers reporting research studies which adopt 'field study perspectives'. These studies were sponsored by the Harvard Business School and the papers were presented at a Colloquium held in June 1986. The colloquium had two principal objectives: (1) 'to understand and document the management accounting practices of actual organizations' (p. 2) and (2) 'to begin the process by which field research methods in management accounting could be established as a legitimate method of enquiry' (p. 3). Whilst the papers give some insights into management accounting practices, it is not clear that they greatly enhance the legitimacy of fieldwork.

In general, the papers describe management accounting practices in particular organisations, but they do not locate them in their organisational contexts. In a number of the papers existing accounting systems were found to be, in some sense, inadequate; however, their origins were not explored in ways which permit the reader to understand how these systems evolved and why they continue to be used. Probably the major omissions in the book are references to the concerns of 'real' people. With the exception of the paper by Dent, there are very few quotations from the individuals who design, use and are affected by accounting systems. The views of managers are mentioned, but these seem to be divorced from the individuals themselves and give very stereotyped impressions of managers. In some of the papers managers are explicitly analysed as 'economic-entities'. Furthermore, the reported beliefs, views and requirements of managers are generally presented without critical evaluation. Such approaches would seem to miss the real opportunities for understanding management accounting which field study methods offer to researchers.

The thirteen papers are arranged in four sections. The first, comprising Chapters 1–3, deals with 'Adapting Management Accounting Systems to Changing Environments'. In Chapter 1 Hertenstein describes how companies use inflation accounting in their management control systems. She compares various characteristics of the accounting systems used in the six companies, but gives few insights into the organisational processes leading to the adoption of inflation accounting. The research was conducted as a cross-sectional study of a small sample of six companies and consequently failed to answer such important questions as why inflation accounting was used in these companies when it is ignored by many others. Rather than examining the evolution of the accounting system in each of the six companies, Hertenstein simply assumed that managers evaluate changes in accounting systems entirely in economic terms: 'they must expect the benefits of the new system to outweigh the costs of implementation' (p. 27).

In Chapter 2, Johnston describes a system of 'competitive charging' for central services which was developed by the Weyerhaeuser Company. Unfortunately, there is little critical evaluation of the system and the management's justifications were accepted at face value. The chapter reads rather like head office selling the system to its divisions. No attempt was made to explore divisional attitudes to the system. A conventional economic view of management accounting was imposed on the study, and the perceived failure of traditional overhead allocation methods was accepted, but not explained. The reasons why the 'new' system had been introduced now, when more traditional methods were considered satisfactory in the past, are not explored.

In Chapter 3 Palepu examines changes in the financial reporting policies of the Harnischfeger Corporation. He describes a financial crisis which was faced by the company, the subsequent changes in accounting policies, and management's justifications for these changes. However, he does not probe these justifications in any depth and consequently fails to explain why the changes came about. Some speculations are advanced at the end of the chapter, but unfortunately these were not explored in the field work.

The second section, dealing with 'Designing New Information and Control Systems', comprises Chapters 4–6. In Chapter 4 Bruns describes the introduction of a new accounting system in a division of a large corporation. This raises some interesting issues concerning the difficulties of changing an embedded (long established and deeply rooted) accounting system. However, an uncritical view is taken of the role of accounting, and the reasons for serious delays in implementing the new system are not fully explored. Thus, it is difficult for the reader to understand the process of change, as distinct from the content of the change.

In Chapter 5, Dent describes the control system used by a computer company. As the only study in the book to use quotations from organisational participants, this chapter acknowledges something which appears to be missing from much of the book—namely, that accounting systems involve people. Furthermore, the chapter adopts an organisational perspective, in contrast to the economic perspective adopted by most of the other contributors. Consequently, it questions the technical, bureaucratic role of accounting which seems to be taken for granted in other chapters.

Although Schreuder, in Chapter 6, sets out to discuss the importance of people in the design and implementation of management information systems, he does not reproduce quotations from the participants in his study. Despite his claim that personalities are important, it is very difficult for the reader to assess the concerns, views, beliefs, etc. of the individuals involved. Nevertheless, the chapter does raise a number of important issues about the role of accounting in organisational power relations. This casts considerable doubt on the consensual view of accounting which is adopted by many of the other contributors to the book.

The third section, Chapters 7–10, describes 'New Directions for Cost Management Systems' and although all four chapters adopt field study approaches, they are based largely on normative reasoning. Chapter 7, by Banker and Datar, describes the problems in implementing a normative model of productivity measurement. In Chapter 8, Cooper and Kaplan provide a normative analysis of cost allocations, together with field based illustrations. They start from the conventional management accounting view of the needs for cost information and the role of cost allocations. They then describe and illustrate their 'improved' method of cost allocation. Patell, in Chapter 9, gives a good technical description of a just-in-time manufacturing system and the associated cost accounting system, but he does not describe how the accounting system fits into the wider systems of organisational control. In Chapter 10, Zimmerman, starting from the assumptions of 'economic man', uses an agency model to describe the incentive effects of accounting systems, with the aid of a field-based illustration of lot-sizing decisions. In each of the chapters in this section, existing accounting methods are claimed to be inadequate in some way, and that improved methods are available. However, the origins of and reasons for existing methods are not examined.

The final section, Chapters 11–13, is concerned with 'Measuring Management Performance'. In Chapter 11, Maher uses a small sample of five companies and a detailed examination of a single company to test an agency theory model of the use of relative performance evaluation. In Chapter 12, Merchant uses a small sample of three companies to conduct a contingency study of why firms disregard the controllability principle. However, both studies require much larger samples fully to explore the underlying research issues. It is not at all clear just how far small sample studies based on fieldwork can be helpful in such instances. By contrast, Chapter 13 illustrates a better use of fieldwork. In that chapter Simmons explores the *uses* made of accounting in performance evaluation in Johnson & Johnson. He adopts an explicitly process view of accounting. It is in this type of work that field studies are more likely to be fruitful.

The particular attraction of field studies is that they enable researchers to get a deeper understanding of management accounting and to locate it in its organisational context. The researcher can obtain a detailed knowledge of the organisation(s) being studied and use this knowledge to explain the observed accounting practices. In this sense, fieldwork can be used to *explain* 'the particular'. This is to be contrasted with conventional accounting research which is more concerned with *predicting* 'the general'. In the latter, samples are used and results are generalised, if appropriate. Many of the contributors to this book refer to their studies as small samples and discuss the consequent difficulties of generalising. This concern for generalisations seems to miss the major attraction of undertaking field studies, i.e., the possibilities they offer for explaining the accounting practices of particular organisations.

Thus, in terms of the two principal objectives described earlier, the book provides some descriptions of management accounting practices, but as a whole, fails to exploit the real opportunities which field studies offer for the understanding of management accounting practice.

University of Manchester Robert W. Scapens

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## Volume 20 Number 77 Winter 1989

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# Forthcoming Articles

R. S. O. Wallace and T. E. Cooke, The Diagnosis and Resolution of Emerging Issues in Corporate Disclosure Practices.

G. J. Holt and P. Moizer, The Meaning of Audit Reports.

## Walter Taplin Prize

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*Accounting and Business Research*, Vol. 20, No. 77, pp. 3–11, 1989

# The Information Content of Cash Flow Figures

**J. L. G. Board and J. F. S. Day***

**Abstract**—This paper investigates the link between earnings and share prices for a sample of UK companies for the years 1961 to 1977. Three measures of earnings were used: the traditional historical cost accounting return and two which were closer to cash flow measures. The strength of the link between earnings and cumulative abnormal returns was investigated relative to the level of inflation. The results indicate that, while there is substantial information content in the traditional historical cost rate of return, there is very little information conveyed by the measure closest to pure cash flow. No support was therefore found for the use of cash flow based reports. Evidence was found showing substantial changes in the nature of the relationship between accounting and stock returns, but this could not be explained by the effects of inflation.

This paper complements the study by Board, Day & Walker (1989) which examined the link between inflation and company profit for a large sample of US companies. The paper examines the link between earnings and share prices for a sample of UK companies, making use of three measures of earnings (two of which are closer to cash flow based measures than historical cost earnings). The strength of this link relative to the rate of inflation is also considered. Section I contains some discussion of the hypotheses under examination, sections II and III contain discussion of the techniques and sample, and sections IV to VII discuss the results of the tests. Section VIII contains some concluding remarks.

## I. Theoretical framework

It now seems generally agreed that, although accounting numbers are not the only source of information about companies' prospects, accounting earnings do provide information to the stock market which is used in the setting of prices. A crude rationale for this belief might be that increased profits indicate an increased likelihood of that company being in a good trading position. A more sophisticated view, following from the implications of the efficient market hypothesis, which highlights the linkages between share prices and earnings, is given below.

Rational shareholders are assumed to be concerned only with their eventual wealth, which is derived from gains made from dividend payments and capital gains. Thus the price of a share should reflect the present value of a stream of expected future dividends. Changes in expectations about this stream will cause the price to change, enabling shareholders to make gains or losses on sale. As the following equation shows, the dividend stream is based on the pattern of expected future cash flows, and so we would expect information which is used to form expectations about the future pattern of cash flows to be useful.

$$P_t = \sum_{t=0}^{\infty} E(D_t)/(1+r)^t = \sum_{t=0}^{\infty} E(CF_t)/(1+r)^t$$

where

$D_t$ represents the dividend paid at time t,

$CF_t$ represents the cash flow at time t, and

r represents an appropriate discount rate.

This will be indicated by a change in share prices when such information is released into the market.

The role of earnings rather than cash flows in this valuation process is an important issue. Accounting earnings might be used as a surrogate for future cash flows.[1] A simple justification for this is that historical cost accounting earnings is the standard reported earnings measure and is the most common variable to be analysed in the press and accounting literature. This suggests that, other things being equal, in a rational market there should be an observable link between earnings and share prices. Furthermore, as current earnings also provide information about future earnings (and hence dividends), in an efficient market only the unexpected component of an earnings announcement will provide new information because prices will already reflect any expected level of earnings. Available evidence suggests that, in both the UK and US, prices reflect publicly available information.

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*The authors are members of the Department of Accounting and Finance, London School of Economics and Political Science. They are most grateful to the referees of this paper, whose suggestions have resulted in a much improved paper.

[1] This issue is discussed in Watts and Zimmerman (1986).

A more complex justification for the use of accounting earnings as a surrogate for cash flows comes from the use of unexpected earnings in tests which examine the link between earnings and abnormal returns. If unexpected earnings are a better indication of the change in expected future cash flows than unexpected cash flows then it is possible that unexpected earnings could have a higher association with abnormal returns than unexpected cash flows. It has been argued that the accruals process by which cash flows are transformed into accounting earnings can mean that accounting earnings are a better guide to 'maintainable' future cash flows than are current cash flows. Easton (1985) shows that accounting earnings are a good predictor of the future stream of cash receipts from an equity investment, and that there is a high correlation between security prices and the present value of receipts. The two measures have operating cash flows in common and several studies have tested the strengths of the links between unexpected earnings and unexpected cash flows and abnormal returns, e.g. Ball and Brown (1968) and Beaver and Dukes (1972). These studies suggest that accounting earnings are a better predictor of future cash flows than are current cash flows. However, the possibility that earnings are used as a surrogate for current cash flows should be investigated. If this is the case, the relation between accounting earnings and share prices will be expected to be weaker than the comparable relation involving actual cash flows.

Essentially, the current announcement has two effects. Firstly, one term in the discounting process is resolved, i.e. $E(CF_t)$ becomes $CF_t$, and, secondly, knowledge of $CF_t$ allows modification of the stream of expected future cash flows $E(CF_{t+1}) \ldots E(CF_T)$. Given the role of cash flows in valuation and the imperfect correlation between historical cost accounting profit, HC, and cash flow, it is possible that direct revelation of $CF_t$ will provide clearer information to investors than would HC earnings (from which an estimate of $CF_t$ would have to be made). The counter argument is that, although the stream $CF_t \ldots CF_T$ is of primary interest, it is $HC_t$ which provides the basis for a better estimate of future cash flows than the current period's cash flow. If true, the results presented below will show that HC dominates cash flow in terms of information content.

The question then arises of the measurement of earnings. Traditional historical cost accounting profit is the usual measure. However, it is well known that under some conditions, notably inflation, use of a traditional HC system, with its adherence to financial capital maintenance, tends to overstate profits and understate asset values (unless increments in asset values are passed through income) thus exaggerating the accounting rate of return. Other measures such as replacement cost (which formed the basis for some of the adjustments proposed in SSAP16), constant purchasing power (proposed in PSSAP7) or cash flow figures could be used instead. This paper examines the usefulness of two measures of cash flow.

One test of the usefulness of alternatives to HC is to examine the nature of the link between alternative earnings measures and share prices during periods of varying inflation. A measure whose information content is greater than that of HC will:

(a) convey more information than HC in any period (i.e. exhibit a stronger link between it and share price movement), *and*

(b) be such that the strength of any link between the measure and share prices will be affected by the rate of inflation to a lesser extent than the comparable relationship using HC.

## II. Techniques used

The methods adopted in this paper are based on the well known method of assessing the relevance of accounting information for investors by examining cumulative abnormal returns (CARs), whose use in this context was examined by Ball and Brown (1968). Their study investigated the question of the association of accounting earnings with share price movements and found such an association. Other researchers have since replicated and extended Ball and Brown's work both using their data and using data relating to other than the US countries.[2] Ball and Brown also considered whether accounting earnings convey information to the stock market and found that, although not very timely, some information is revealed by the annual announcement.[3]

The argument is that share prices or returns are affected by two classes of information: market wide, and firm specific. The former can be controlled by using a market index (e.g. the FT Actuaries) to remove these effects from individual firms' returns. Any remaining variation can then be attributed to firm specific factors. To do this, it is conventional to use a time series regression of the following form:

$$R_{it} = a_i + b_i M_t + e_{it} \qquad (1)$$

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[2] Beaver, Lambert and Morse (1980), for example, considered the relation between the magnitude of unexpected earnings and the magnitude of the abnormal rate of return.

[3] If they do, then unexpected earnings should have the same sign as the mean abnormal rate of return in the month in which the earnings were announced. Later studies have confirmed this result (e.g. Benston and Watts, 1978).

where:

$R_{it}$ is the return on company i's shares in period t,
$M_t$ is the return on the market index in period t,
$a_i$ and $b_i$ are coefficients, estimated in a previous period, and
$e_{it}$ measures firm specific effects.

Thus, by focusing on $e_{it}$, rather than $R_{it}$, one can make at least partial allowance for systematic market wide effects.

To avoid bias, rather than use the $e_{it}$ values directly it is appropriate to use values of $a_i$ and $b_i$ which have been estimated over a different (usually immediately preceding) period, and to form predicted returns for company i for the months of interest. The difference between actual and predicted returns can then be used as unbiased estimates of the firm specific effects. For example, we might use the period 1975–1980 to form estimates of $a_i$ and $b_i$ which are then used to predict returns for the months around the 1981 earnings release date.

The use of the market model is not above criticism. Although it is used in almost every study of information content, studies such as that by Brown and Warner (1980) indicate that it is not a particularly sensitive model. Nevertheless, it is part of the dominant approach to these studies and as the purpose of this paper is to compare different accounting numbers, as long as the method is consistent between cash flow and HC earnings the results are unlikely to be substantially affected.

If an earnings figure is announced in one month, any effect of the announcement on expectations about next year's earnings will be observed in the $e_{it}$ values for the months leading up to the release. A summary measure of the effect is simply to compound these values for the twelve months between announcements (after which the next year's announcement takes place).[4] Thus:

$$CAR_{it} = \prod_{k=t}^{t+11} [(1 + e_{ik})]^{(1/12)}$$

Repeating this adjustment for all companies in the sample will result in a set of CARs, to use in the tests.

All that remains is to define a measure of unexpected earnings. As discussed in section I, the figure used should reflect the unexpected component of this year's earnings. In the absence of a well specified model of investors' expectations, a simple model was used: the market is hypothesised to expect the firm to earn the same this year as it did last. Unexpected earnings are then the difference between this year's earnings and last, i.e. $E_{it}—E_{it-1}$. This definition of unexpected earnings is essentially that of a random walk. In a related study (Board, Day and Walker, 1988) two alternative models of predicted income were used: the average of that company's income over the last six years, and the value predicted from a time series regression of this company's income on the average income for the companies in the simple. Application of these three models indicated that the sample random walk model used in this paper was clearly superior to the other two. Of course, this does not mean that earnings are random but, rather, that no simple model seems better able to describe the pattern.

This model of investor expectations is naive. Recent work in the USA examines the use of directly observed expectations (e.g. Brown, Hagerman, Griffin and Zmijewski 1987a and 1987b), and from this it appears possible that more sophisticated models or direct observations of expectations would permit different conclusions to be drawn. Of course there are problems with directly observed expectations data, not least that this is not available in the UK for the long sample period considered in this paper.

For any year we now have for each company a figure for CAR and three for unexpected earnings (one for each earnings measure used). The test used is a cross-sectional regression of the form:

$$CAR_{it} = a_t + b_t E_{it} \qquad (2)$$

where the subscript t indicates that the test takes place in year t, and $E_{it}$ is the unexpected earnings figure. There will be one equation of the form of (2) for each earnings measure. There will be a significant information effect if the coefficient $b_t$, or equivalently the $R^2$, is significantly different from zero.

## III. Dataset

Monthly share price data were taken from the London Share Price Database distributed by the London Business School. Accounting data were obtained from the Cambridge/DTI data and verified against the EXSTAT files. The following selection criteria were used. Firms should:

(i) be publicly quoted and be in the first 800 of *The Times* top 1000 UK firms (firms lower than this are likely to suffer from estimation problems associated with thin trading). The sample numbered 416 after firms without a stock exchange quotation had been removed.
(ii) have an accounting year end of December 31 (this is the most common year end date). 233 firms remained in the sample after this stage.
(iii) be in the manufacturing, non-oil, sector (it was felt desirable to keep to manufacturing companies and exclude others in order to

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[4] The reason for the cumulation over a full 12 months is to attempt to capture the entire effect of the earnings values. The use of 12 month cumulation is conventional in this type of study in which it is the amount of information rather than the method of transmission which is of primary interest. To assess the effect of this, 1 and 3 months cumulation were also used in the tests for information content. It was found that 12 months cumulation yielded by far the strongest results.

avoid earnings streams which might otherwise be unduly influenced by circumstances which did not have a market-wide impact). This reduced the sample to 130 companies.

(iv) have a full set of accounting data for the years 1961–1977 (the years covered by this paper). The main cause of incomplete data was companies incorporating, merging, or liquidating during this period. This left 68 companies.

(v) have not more than 10 missing share returns over the period 1961–1977 (more than this and the construction of abnormal return indices becomes difficult).

These criteria produced a sample of 44 companies. Of these 5 were excluded because inspection and comparison with alternative data sources led to the conclusion that their accounting data, as recorded, contained errors and were not completely reliable, leaving a sample of 39 manufacturing companies.

Three aspects of this research design give cause for concern: the data, the models of investor expectations and the use of the market model. The sample is both small and biased in that only manufacturing companies which traded over the 18 year sample period are considered. It is possible that cash flow data is of greater value in non-manufacturing or new companies, in which case the value of cash flow data is underestimated in this sample. Statistically, although small, the sample is quite large enough to permit 'normal' tests and analysis.

Three measures of earnings were used:

(a) ROI = Net Income/NBV
(b) WCAP = (Net income + Depreciation + Deferred Taxation)/NBV
(c) NETQ = WCAP + (Change in Stock and Work in Progress)/NBV

where:

Net Income
= operating profit + dividends + interest
+ other income received
− interest paid − tax paid
− transfers to deferred taxation reserve,

and

NBV = opening net book value of shareholders' funds.

Measure (a) is the HC return on investment measure, (b) is based on working capital and (c) on net cash (quick) assets. WCAP corresponds closely to a measure used by Beaver and Dukes (1982), but NETQ, which incorporates an adjustment of the change in stocks, does not seem to be a measure yet tested by other researchers. All three are then expressed as accounting rates of return and, as discussed above, the unexpected earnings for each measure is simply the first difference of that measure. Although Christie (1987) concludes that market value rather than book value is the correct deflator in returns studies, book values have been used in many previous studies and are used here in the calculation of all three measures.

For each company, the values of the cumulative abnormal returns were estimated as follows:

(i) Regress $R_{it}$ on $M_t$ (equation (1)) using 6 years (initially January 1955 to December 1960) of the sample data. As a balance between the desire for estimates based on a long time series and the requirement for stability over the estimation and prediction periods, six years was chosen as the length of the estimation period.

(ii) Use the estimated $a_i$ and $b_i$ coefficients to calculate the predicted $R_{it}$ values for the 12 months leading up to the announcement. The difference between actual and predicted values form the abnormal returns for the period.

(iii) Use the 12 abnormal returns to find the cumulative abnormal return for the year.

(iv) 'Roll' the sample frame on by 12 months and repeat steps (i) to (iii) for January 1956 to February 1963, January 1957 to February 1964, and so on until the final period from January 1971 to February 1978.

After this process, we have four numbers (CAR, ROI, WCAP and NETQ) for each of the 39 companies for each of the 17 years of the sample period.

## IV. The information content of different earnings measured

This section is concerned with the examination of the information content of the three measures of unexpected earnings. The test used (see section II) was based on a regression model of the form of (2) and treated each year as independent of the others. The results are summarised in Table 1.

**Table 1**
**Information Content of Three Accounting Measures**

| *Year* | *RPI* | *ROI* | *WCAP* | *NETQ* |
|---|---|---|---|---|
| 1962 | 0.041 | 0.401* | 0.275* | 0.242* |
| 1963 | 0.021 | 0.179* | 0.118* | 0.099 |
| 1964 | 0.033 | 0.015 | 0.005 | 0.006 |
| 1965 | 0.048 | 0.015 | 0.020 | 0.017 |
| 1966 | 0.038 | 0.024 | 0.029 | 0.011 |
| 1967 | 0.025 | 0.026 | 0.010 | 0.017 |
| 1968 | 0.048 | 0.215* | 0.150* | 0.028 |
| 1969 | 0.054 | 0.317* | 0.010 | 0.001 |
| 1970 | 0.064 | 0.128* | 0.154* | 0.001 |
| 1971 | 0.094 | 0.064 | 0.107* | 0.007 |
| 1972 | 0.071 | 0.139* | 0.112* | 0.000 |
| 1973 | 0.091 | 0.121* | 0.071 | 0.020 |
| 1974 | 0.160 | 0.208* | 0.030 | 0.029 |
| 1975 | 0.242 | 0.039 | 0.009 | 0.055 |
| 1976 | 0.165 | 0.060 | 0.058 | 0.012 |
| 1977 | 0.159 | 0.136* | 0.276* | 0.001 |

*Significant at 5% level.
For explanation of column headings see Table 2.

**Table 2**
**Variable Names Used in Tests for Incremental Information**

| | |
|---|---|
| RPI | Rate of inflation (retail price index) |
| ROI | Information content of historical cost based rate of return |
| WCAP | Information content of working capital based rate of return |
| NETQ | Information content of quick asset based rate of return |
| WCRO | Information content of WCAP over ROI |
| NQRO | Information content of NETQ over ROI |
| ROWC | Information content of ROI over WCAP |
| NQWC | Information content of NETQ over WCAP |
| RONQ | Information content of ROI over NETQ |
| WCNQ | Information content of WCAP over NETQ |

The first two columns of the table show, respectively, the year and the rate of inflation, measured by the proportionate change in the retail price index (RPI), over that year. The following three columns show the results for ROI, WCAP and NETQ respectively. The entries in the column show the 'explanatory power' of the regression, as measured by the coefficient of determination, $R^2$. An asterisk indicates that the coefficient was significant at the 5% level. Thus, marked entries indicated statistically significant relationships between unexpected earnings and share prices.

It can be seen that there is a substantial information content to the ROI measure. Significant information is observed in 9 of the 16 years and the WCAP measure produces a significant result in 7 years. However, NETQ apparently contains very little information which helps investors in their evaluation of companies.

## V. Tests for incremental information content

An additional test for the year by year impact of earnings figures is to examine not whether one measure is reflected in the abnormal returns but whether one measure contains more information than is contained in another. To examine the incremental information content of, say, NETQ over ROI the following procedure is used:[5]

(i) Regress CAR on ROI:

$$CAR_{it} = a_t + b_t ROI_{it} + w_{it}$$

(ii) Regress NETQ on ROI:

$$NETQ_{it} = a_t + b_t ROI_{it} + z_{it}$$

The test of section IV can then be repeated using $w_{it}$ instead of $CAR_{it}$ and $z_{it}$ instead of $NETQ_{it}$:

(iii) Regress $z_{it}$ on $w_{it}$: $w_{it} = a_t + b_t z_{it} + x_{it}$.

The first regression removes all influence of ROI from CAR, while the second removes any influence of ROI from NETQ earnings. If NETQ is to be judged superior to ROI, it should be able to explain at least part of the variation in CAR which is unexplained by ROI. Note that it is, in principle, possible both for NETQ to have incremental information content over ROI and, simultaneously, for ROI to have incremental information content over NETQ. The interpretation of such a finding would be that each reflects different information from the other. Consequently, although both remain useful, neither dominates the other. Table 2 shows the naming conventions used in the tests for incremental information content.

The results are shown in Table 3. It seems that both ROI and WCAP contain substantial information content over NETQ. This is as expected from the earlier discussion in which the absence of any significant information content of NETQ was noted. Similarly, there is no suggestion that NETQ contains information that is not already contained in the ROI and WCAP figures. Comparing now ROI and WCAP, it seem that ROI has incremental information over WCAP in 5 of the 16 years, while WCAP conveys incremental information in 2. Since ROI is the existing accepted measure, any replacement for it would have to be demonstrably superior to it. Therefore, these results do not provide strong support for the replacement of ROI by WCAP, nor do they suggest that the WCAP figures provide particularly valuable information.

## VI. Time series tests

In the light of the widespread view that HC, and hence ROI, becomes unreliable during periods of inflation, it is to be expected that its information

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[5] As discussed in Christie *et al.* (1984), this two stage procedure is no different to a single, bivariate regression of the form:

$$CAR_{it} = a_t + b_t HC_{it} + c_t WCAP_{it} + v_{it}.$$

As the two methods are equivalent, the choice between them is arbitrary. We chose the two stage method to aid comparison with earlier work.

**Table 3**
**Incremental Information Content Results**

| *Year* | *WCRO* | *NQRO* | *ROWC* | *NQWC* | *RONQ* | *WCNQ* |
|---|---|---|---|---|---|---|
| 1962 | 0.059 | 0.063 | 0.222* | 0.122* | 0.259* | 0.160* |
| 1963 | 0.039 | 0.133* | 0.106* | 0.126* | 0.210* | 0.144* |
| 1964 | 0.023 | 0.028 | 0.033 | 0.017 | 0.038 | 0.016 |
| 1965 | 0.003 | 0.016 | 0.001 | 0.016 | 0.010 | 0.012 |
| 1966 | 0.006 | 0.044 | 0.002 | 0.056 | 0.057 | 0.072 |
| 1967 | 0.058 | 0.007 | 0.073 | 0.011 | 0.016 | 0.003 |
| 1968 | 0.041 | 0.112* | 0.114* | 0.114* | 0.283* | 0.225* |
| 1969 | 0.212* | 0.001 | 0.457* | 0.000 | 0.317* | 0.009 |
| 1970 | 0.033 | 0.008 | 0.004 | 0.007 | 0.134* | 0.159* |
| 1971 | 0.060 | 0.008 | 0.016 | 0.012 | 0.066 | 0.112* |
| 1972 | 0.000 | 0.000 | 0.030 | 0.001 | 0.138* | 0.112* |
| 1973 | 0.001 | 0.030 | 0.054 | 0.009 | 0.130* | 0.061 |
| 1974 | 0.091 | 0.013 | 0.258* | 0.032 | 0.195* | 0.033 |
| 1975 | 0.012 | 0.046 | 0.041 | 0.051 | 0.029 | 0.004 |
| 1976 | 0.012 | 0.004 | 0.014 | 0.008 | 0.052 | 0.054 |
| 1977 | 0.162* | 0.010 | 0.001 | 0.027 | 0.144* | 0.295* |

The column headings indicate results for:

| | |
|---|---|
| WCRO | Information content of WCAP over ROI |
| NQRO | Information content of NETQ over ROI |
| ROWC | Information content of ROI over WCAP |
| NQWC | Information content of NETQ over WCAP |
| RONQ | Information content of ROI over NETQ |
| WCNQ | Information content of WCAP over NETQ |

content would decline during such times.[6] One very simple way of looking for such a decline is to compare the rate of inflation, measured by the retail price index RPI, for each year with the goodness of fit of regression (2). The raw data for these regressions comes from column 1 of Table 1 which shows the rate of inflation, and the $R^2$ values resulting from the information content tests (i.e. the application of regression (2) to each of the earnings measures) which are reported in the remaining columns of Table 1 and, for incremental information content, in Table 4. The first panel of Table 4 shows summary results for regression of the form:

$$R^2_{Et} = a + b\,RPI_t \qquad (3)$$

where $R^2_{Et}$ represents the appropriate $R^2$ value for a particular earnings figure in a particular year.[7]

**Table 4**
**Time Series Tests**

| *Dependent* | *Constant* | *Slope* | *$R^2$* |
|---|---|---|---|
| ROI | 0.154* | −0.276 | 0.025 |
| WCAP | 0.093* | −0.042 | 0.001 |
| NETQ | 0.046 | −0.137 | 0.021 |
| WCRO | 0.046 | 0.565 | 0.004 |
| NQRO | 0.047 | −0.172 | 0.077 |
| ROWC | 0.108 | −0.222 | 0.013 |
| NQWC | 0.051 | −0.150 | 0.048 |
| RONQ | 0.157 | −0.322 | 0.043 |
| WCNQ | 0.097 | −0.059 | 0.002 |

Significant at 5% level.

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[6] Since HC is adversely affected by inflation, it would be expected that, in periods of high inflation, the link between reported earnings and abnormal returns would change. The nature of the change depends on the effect of inflation on expectations. Suppose inflation was perfectly anticipated and all companies were equally affected by inflation then both the slope coefficient and the $R^2$, our measure of the above link, would be unaffected by inflation. Since investors would simply divide all earnings figures by the inflation rate, the only effect would be a shift downwards of the intercept. If inflation was perfectly anticipated but the effect was not constant across companies, the cross-sectional nature of the regressions would be expected to produce a shift in the intercept (by the average effect of inflation) and also a change in the slope coefficient reflecting the differing effect of inflation on each company. The $R^2$ need not be affected, since the 'correct' forecast of future cash flows can still be made for each company. However, to the extent that inflation is unanticipated, its effect on earnings cannot be fully calculated *ex ante* and a decline in the goodness of fit of the earnings/excess returns relation would be expected. In the extreme case in which inflation is completely unexpected and its effect on individual companies unknown, the reported HC earnings figure would yield no information and the effect of the announcement of such earnings would have no effect on share prices.

[7] Because we are interested in the relationship between the link between inflation and information content, the tests reported in Table 3 are based on 2 tailed tests. The null hypothesis is that the coefficients are significantly different to zero (either positive or negative).

We would expect the link between $R^2_{ROIt}$ and RPI to be stronger than those between RPI and $R^2_{WCAPt}$ or $R^2_{NETQt}$, because WCAP and NETQ, being cash flow measures, should be less sensitive to the effects of inflation than HC (if only because of the distortion induced by items such as HC depreciation, which are excluded from WCAP and NETQ). There is some indicative support for this hypothesis in that the link between inflation and earnings is strongest when earnings are measured by ROI and that in all cases there is a negative relation between inflation and information content. This relation is weakest for WCAP, the earnings definition which has information content as well as being based on cash flows. However, the effects are slight and not statistically significant. There is, therefore, no formal support for the hypothesis that inflation has a material effect on the information content of the various income numbers.

The second part of Table 4 shows the results of similar regressions in which the dependent variable is the $R^2$ value from the incremental information tests. Although the link between these figures and inflation is slightly greater, a statistically significant relation does not exist.[8]

## VII. Direct time series tests

A more direct approach to the examination of the time series pattern of information content is to include time explicitly in the information content tests. This can be achieved either by addition of an inflation term to equation (2), or by modelling the effect of inflation on the slope and intercept of (2). The two approaches are shown in equations (4) and (5), the derivation of which is discussed in the appendix. Alternatively, a set of dummy variables could be used to capture time, rather than specific inflationary, effects. Such a model appears as equations (6) and (7) below.

$$CAR_{it} = a + bE_{it} + cEPI_t \tag{4}$$

$$CAR_{it} = a + bE_{it} + cRPI_t + dE_{it}RPI_t \tag{5}$$

$$CAR_{it} = \sum_{j=1}^{16} a_j D_{jt} + bE_{it} \tag{6}$$

$$CAR_{it} = \sum_{j=1}^{16} a_j D_{jt} + bE_{it} + dE_{it}RPI_t \tag{7}$$

The variables $D_{jt}$ in (6) and (7) represent a set of sixteen dummy variables each taking the value 1 for each month in one of the sample years and 0 otherwise, and $E_{it}$ represents one of the three earnings measures (ROI, WCAP or NETQ). Thus, in these models, the intercept is replaced by sixteen new variables. The appendix to this paper shows the derivation of these models.

The results are shown in Table 5. It is clear that there does seem to have been an important relation between stock returns and both inflation and published earnings. In the equations of model (4), both earnings and inflation have a positive effect on returns. When the cross product terms, $E_{it}RPI_t$, are included to allow for the indirect impact of inflation through its effect on earnings, it tends as expected to reduce returns. However, the lack of statistical significance on these coefficients means that firm conclusions should not be drawn from this.

When time is explicitly included through the series of dummy variables, the explanatory power of the regressions increases. The increased significance of the time variables, used in (6) and (7), over the simple RPI measure, used in (4) and (5),

**Table 5**
**Direct Time Series Tests**

| *Model* | *Earn* | *const* | *E* | *RPI* | *E.RPI* | *D* | *$R^2$* |
|---|---|---|---|---|---|---|---|
| (4) | ROI | −0.072* | 2.232* | 0.630* | | | 0.097* |
| | WCAP | −0.079* | 1.653* | 0.676* | | | 0.067* |
| | NETQ | −0.056* | 0.208* | 0.509* | | | 0.020* |
| (5) | ROI | −0.072* | 2.565* | 0.622* | −3.166 | | 0.097* |
| | WCAP | −0.079* | 2.314* | 0.653* | −5.953 | | 0.070* |
| | NETQ | −0.055* | 0.165 | 0.496* | 0.352 | | 0.020* |
| (6) | ROI | | 2.646* | | | 6 | 0.157* |
| | WCAP | | 2.088* | | | 8 | 0.129* |
| | NETQ | | 0.121 | | | 4 | 0.065* |
| (7) | ROI | | 3.210* | | −5.137 | 6 | 0.158* |
| | WCAP | | 2.854* | | −6.759 | 7 | 0.132* |
| | NETQ | | 0.070 | | 0.450 | 4 | 0.065* |

Significant at 10% level.
Column D indicates the number of dummy variables significant at 5% level.

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[8] Inspection of the residuals from these regressions revealed some autocorrelation. However, when maximum likelihood procedure was used to control for this, no change in the pattern of the results was observed.

suggests that the effect is not caused by inflation alone.[9]

## VIII. Conclusions

In this paper we have examined the information, as reflected in stock market returns, contained in earnings figures based on historical costs and two measures of cash flow. No previous UK studies have examined changes in the information content of earnings figures over time. The results presented here compare data for the years 1961 to 1977. The results can be summarised as follows:

(a) There is considerable evidence of a consistent information content both in the traditional return on investment measure and in the working capital based measure of cash flow. There is no evidence of information content in the net cash assets earnings figures (section IV).

(b) There is some evidence that the return on investment figures yield more information than either of the others, and that the working capital measure is superior to the net cash assets measure (section V).

(c) There is little evidence that the information content of any of the earnings figures is substantially influenced by inflation. In particular, the historical cost values, which are most in error during inflation, do not appear to be regarded as more unreliable during inflationary than during non-inflationary periods.

(d) There is some evidence of a time effect on the information content of earnings measure, and this does not appear to be wholly caused by inflation. The causes of this effect deserve further investigation.

Although the findings of this study do not support the notion that historical cost earnings should be replaced (or indeed supplemented), it must be remembered that there are other uses to which published accounts may be put.[10] While it is beyond the scope of this paper to examine such aspects of cash flow accounting,[11] it is likely that the real value of cash flow information will be found in these areas.

Irrespective of the efficient markets hypothesis it is possible that, even if cash flow data are economically more meaningful than HC, investors will continue to base their decisions on HC. Empirically, this would mean that the dominance of cash flow over HC data would not be revealed. Possible reasons why investors may behave in this way are: individuals are used to HC and, while it is still available, see no reason to change their behaviour, especially as they are likely to believe that other investors, and thus the market, base their decisions upon HC earnings. Secondly, as dividend payouts are statutorily based upon HC earnings (realised profits calculated using the accruals convention), HC is seen as a more relevant basis for decision-making than cash flow measures.

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[9] The significant dummy variables are shown in the following Table;

| Year | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ROI | * |  | * | * |  |  |  | * | * |  | * |  |  |
| WCAP | * |  | * | * |  |  |  | * | * |  | * | * | * |
| NETQ | * |  |  |  |  | * | * |  | * |  |  |  |  |

[10] See, for example, the references in Carsberg and Page (1985).

[11] For a summary of this literature see Lee (1981).

## Appendix

The time series formulation of section VII, and particularly of model (5), is obtained as follows. Assume that the basic relationship between abnormal returns and earnings used in sections IV to VI holds, i.e.

$$CAR_{it} = a_t + b_t E_{it} + u_{it} \qquad (A1)$$

which applies cross-sectionally in each year.

Now assume that inflation has an indirect effect on $CAR_{it}$ through its effect on $a_t$ and $b_t$. Thus:

$$a_t = a_1 + RPI_t + v_{it} \qquad (A2)$$

$$b_t = b_t + b_2\ RPI_t + w_{it} \qquad (A3)$$

This assumes that there are simple linear, but possibly differing, effects of $RPI_{it}$ on $a_t$ and $b_t$. Substituting (A2) and (A3) into (A1) yields:

$$CAR_{it} = a_1 + a_2 RPI_t + b_1 E_{it} + b_2 RPI_t E_{it}$$
$$+ w_{it} E_{it} + v_t + u_{it} \qquad (A4)$$

In this, $a_1$, $a_2$, $b_1$ and $b_2$ can be readily identified with a, c, b and d in (5) above. However the final three terms cannot be directly associated with the residual from the estimated form of (5). This is because the use of ordinary least squares requires, among other things, that the residual terms be uncorrected with the explanatory variables (Johnston 1983). Clearly, as $E_{it}$ appears both as an independent variable and in the residual, this requirement cannot be met.

The general problem of heteroskedasticity has been considered by White (1980), who suggests a method of adjusting the estimation method to yield consistent estimates of the coefficients' standard errors (the coefficient estimates themselves will, in any case, be unbiased). These estimation methods were applied in the regressions of (5), and the reported significance levels reflect the corrected standard errors. In the event, the correction made little difference to the 'naive' values, which suggests that the heteroskedasticity may not have been particularly severe in this case. Because the White procedure is a large sample method, errors in our rather small sample are likely to remain in the adjusted standard errors on which the results in Table 4 are based. However, given the marginal impact of the adjustments in this case, we have no reason to suspect that heteroskedasticity was at all severe in the present context.

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# Cash Flow and the Eurotunnel

**R. T. Wearing***

**Abstract**—The Channel Tunnel, a major international investment project funded approximately 80% by debt and 20% by equity, is expected to be completed by 1993. The Eurotunnel *Offer for Sale* document (published in November 1987) contained financial projections based on traditional accruals-based principles. This paper converts the published information to a cash flow-based format and critically assesses the depreciation, taxation, dividend and financing policy implications. The relevance of depreciation policy in cases of projects with finite lives is discussed, and the paper concludes that information prepared on cash flow-based principles provides an alternative and more useful perspective of the Eurotunnel operations.

## Introduction

Despite the existence of a substantial literature concerning cash flow reporting,[1] there is no requirement for UK limited liability companies to provide a cash flow report as part of their audited financial statements. This paper has two main objectives: firstly, to question the use of depreciation in assessing the implications of long term construction contracts, and, secondly, to provide additional support for cash flow information using the specific example of Eurotunnel.

The Channel Tunnel is used as a case study and it is argued that the case study approach represented in this paper does have an important role to play.[2] That role concerns the process of formulating hypotheses with respect to relationships between the nature of financial reports, the motivations underlying the provision of that information and the benefits which users are assumed to derive from that information. It is hoped that the issues discussed in this paper may assist in that process.

In November 1987 Eurotunnel issued an *Offer for Sale*[3] of 'units' in the Eurotunnel project. Arnold and Wearing (1988) calculated revised cash flow data, based on the published projections of sources and application of funds, to argue that the revised cash flow data provide more useful insights into the financing and dividend policies of Eurotunnel. The additional cash flow data provided in this paper offer an alternative perspective of the operations of Eurotunnel to that presented in the *Offer for Sale*. This is achieved by examining the project's depreciation, taxation and dividend policies, and showing the impact that these have on the financing requirements. It soon becomes apparent that the financing and dividend policies are strongly influenced by the depreciation policy, which poses the question: 'why should an entity which is undertaking a venture for what appears to be a limited period provide depreciation?'.

In order to encourage cash flow reporting, it needs to be shown that cash flow reports would provide additional relevant information to decision users. The following three criteria have been selected to assess the usefulness of cash flow data. Would cash flow reporting:

(1) Help to explain the future financing requirements?
(2) Help to explain the effects of the chosen dividend policy and point to alternative dividend decisions?
(3) Indicate the future policy options available to management?

If it can be shown that cash flow data provides useful information in these three areas, then the case for cash flow reporting is considerably strengthened.

## Description of Eurotunnel project and group structure

In April 1985 the French and UK governments invited tenders for the construction and operation of a fixed link between the two countries. The scheme put forward by the Eurotunnel Group was accepted early in 1986 and the Group was awarded a Concession to construct and operate the Channel Tunnel link until July 2042. The agreement was formally ratified by a treaty between the UK and France in July 1987 and construction is expected to take place during the period 1988 to 1993.

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*The author is lecturer in accounting at the University of Essex. He gratefully acknowledges the helpful comments of Tony Arnold, University of Essex, and participants of seminars at Newcastle and Monash Universities, Australia, and Otago and Canterbury Universities, New Zealand. This paper has benefitted from the constructive comments of two anonymous referees.

[1] For an extensive bibliography of the cash flow reporting literature see Lee (1984, pp. 139–142).

[2] Hagg and Hedlund (1979) encourage the use of case methods and argue that they can play an important role in accounting research (1979, p. 142):

> In an area where there is a lack of theory, real difficulties in defining context, an acknowledged importance of patterns of historical development and continued questioning as to the normative or descriptive basis of the discipline, more explicit consideration needs to be given to the advantages that case approaches to research and inquiry can offer.

[3] Eurotunnel, *Offer for Sale*, London, November 1987.

The Eurotunnel Group comprises two major holding companies—Eurotunnel PLC (Eplc) and Eurotunnel SA (Esa). Eplc has four subsidiaries which are responsible for the financing, construction and operation of the Tunnel. The subsidiary which is responsible for construction is Channel Tunnel Group Ltd (CTG). Esa has a similar structure, the company responsible for the French side of the construction being France Manche SA (FM). Eplc and Esa have entered into contracts with CTG and FM respectively for the construction and commissioning of the Channel Tunnel System and the construction has been allocated so that the work is shared approximately equally between CTG and FM. For simplicity, the entire group will henceforth be referred to as either 'Eurotunnel' or the 'Group'.

The November 1987 *Offer for Sale* consisted of an offer in the UK of 101 m units and a similar offer in France. In addition, an international placing of 18 m units was arranged. A unit comprised one share in Eurotunnel PLC and one share in Eurotunnel SA. Dealings in the shares of Eurotunnel PLC and Eurotunnel SA are in the form of units. The offer price in the UK was 350p per unit and 35 francs per unit in France and an exchange rate of £1 = 10 francs was used for costings and financial projections.

The main source of information for this paper is the *Offer for Sale* document which does not clearly specify what will happen when the Concession ends in July 2042. It is clear that the shareholders will not be entitled to dividends after that date. The UK and French governments would be entitled in 2042 to take possession of the Channel Tunnel System. All land necessary for the construction and operation of the system will be owned by the UK and French governments and leased to Eurotunnel over the Concession period at a nominal rent and this issue is considered further under discussion and conclusions.

## *Offer for Sale* information and revised data

Table 1 reproduces the Published Profit Projections from the *Offer for Sale* (pp. 54–55). This is provided for information and to highlight the one-to-one correspondence between 'profit for the year available for distribution' and 'dividend payable'.

Table 2 reproduces the published 'Cash Flow Projections' (in reality statements of source and application of funds) from the *Offer for Sale* (pp. 54–55). 1994 is expected to be the first full year of operation and 2041 the final full year of operation. The published information contained financial projections for the years 1993–2003 inclusive and for 2013, 2023, 2033 and 2041. It should be noted that 2013, 2023 and 2033 are all years in which significant purchases of fixed assets are projected to take place.

Table 3 is based on the revised cash flow projections of Arnold and Wearing (1988, p. 59) and, in addition, shows the relationship between original debt, refinanced debt and a net figure for debt and cash balance.

Table 4 contains data from Table 3 relating to operating cash flow, interest, tax and dividends. Table 4 also contains projections of cash flows as estimated by the author for each of the years 2004–2012.

For clarity, each of the years is denoted by RP or EP. RP refers to a forecast projection made by Eurotunnel which has been revised to a true cash flow basis. EP refers to estimated projections made by the author for each of the years 2004–2012 inclusive. The purpose of these estimated projections is to provide a fuller account of the pattern of cash flows over the first 20 years of the operating life. Since the estimates involve assumptions to allow interpolation they will inevitably be subject to some degree of error and these figures should be used with caution.[4] However, the estimated projections after interpolation appear to correspond

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[4] Financial projections for the years 1993–2003, 2013, 2023, 2033, 2041 were published in the *Offer for Sale*. Estimates for the years 2004–2012 were made on the assumption of steady growth rates.

Let the amount of dividends paid in the first year be $\alpha$ and the amount of dividends in the $n$th year be $\beta$, then the annual rate of dividend growth ($\delta$) is given by:

$$\alpha(1+\delta)^{n-1} = \beta$$

$$\delta = (\beta/\alpha)^{1/n-1} - 1$$

For example, given that dividends to be paid in 2003 are projected at £513m while dividends to be paid in 2013 are projected at £1,387m, the annual rate of growth of dividends is estimated as:

$$\delta = (\beta/\alpha)^{1/11-1} - 1$$

$$\delta = (1{,}387/513)^{.1} - 1$$

$$\delta = 10.46\%$$

This estimate is reasonably close to the projected annual rate of dividend growth of 10% assumed in the *Offer for Sale* (p. 36) between 2003 and 2013.

A similar procedure was followed to estimate average annual growth rates between 2003 and 2013 for operating cash flow (7.42%) and taxation paid (10.75%). Net interest is stated in the published financial projections as £171m (expense) in 2003 and £39m (revenue) in 2013. In these circumstances a straight line interpolation was used. Although some error is therefore inevitable in the estimated data, it is not believed that it is sufficiently large to distort the estimated trends unduly.

**Table 1 Eurotunnel Financial Projections**
*Published Profit Projections*

| | 1993<br>£m | 1994<br>£m | 1995<br>£m | 1996<br>£m | 1997<br>£m | 1998<br>£m | 1999<br>£m | 2000<br>£m | 2001<br>£m | 2002<br>£m | 2003<br>£m | 2013<br>£m | 2023<br>£m | 2033<br>£m | 2041<br>£m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turnover | 488 | 762 | 835 | 908 | 986 | 1,072 | 1,158 | 1,254 | 1,356 | 1,466 | 1,586 | 3,236 | 6,184 | 11,356 | 17,824 |
| Operating costs | (86) | (145) | (155) | (168) | (183) | (206) | (216) | (235) | (255) | (277) | (304) | (631) | (1,207) | (2,246) | (3,604) |
| Depreciation | (103) | (158) | (159) | (160) | (162) | (167) | (169) | (171) | (173) | (176) | (184) | (234) | (271) | (328) | (383) |
| Interest | (229) | (351) | (322) | (307) | (291) | (277) | (265) | (234) | (212) | (190) | (171) | 39 | 173 | 370 | 616 |
| Profit before taxation | 70 | 108 | 199 | 273 | 350 | 422 | 508 | 614 | 716 | 823 | 927 | 2,410 | 4,879 | 9,152 | 14,453 |
| Taxation | (7) | (18) | (38) | (53) | (69) | (88) | (198) | (240) | (279) | (321) | (361) | (934) | (1,893) | (3,547) | (5,573) |
| Profit after taxation | 63 | 90 | 161 | 220 | 281 | 334 | 310 | 374 | 437 | 502 | 566 | 1,476 | 2,986 | 5,605 | 8,880 |
| Transfer to reserves | (1) | (2) | (3) | (3) | (4) | (6) | (7) | (9) | (5) | | | | | | |
| Profit for the year available for distribution | 62 | 88 | 158 | 217 | 277 | 328 | 303 | 365 | 432 | 502 | 566 | 1,476 | 2,986 | 5,605 | 8,880 |
| Dividends payable | — | 149 | 169 | 217 | 277 | 328 | 303 | 365 | 432 | 502 | 566 | 1,476 | 2,986 | 5,605 | 8,880 |

**Table 2 Eurotunnel Financial Projections**
*Published Cash Flow Projections*

| | 1993 £m | 1994 £m | 1995 £m | 1996 £m | 1997 £m | 1998 £m | 1999 £m | 2000 £m | 2001 £m | 2002 £m | 2003 £m | 2013 £m | 2023 £m | 2033 £m | 2041 £m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source of funds | | | | | | | | | | | | | | | |
| Profit before taxation | 70 | 108 | 199 | 273 | 350 | 422 | 508 | 614 | 716 | 823 | 927 | 2,410 | 4,879 | 9,152 | 14,453 |
| Depreciation | 103 | 158 | 159 | 160 | 162 | 167 | 169 | 171 | 173 | 176 | 184 | 234 | 271 | 328 | 383 |
| Issue of long term debt | 321 | | 776 | 352 | 361 | 452 | | | | | | | | | |
| Issue of share capital | | 52 | 25 | | | | | | | | | | | | |
| | 494 | 318 | 1,159 | 785 | 873 | 1,041 | 677 | 785 | 889 | 999 | 1,111 | 2,644 | 5,150 | 9,480 | 14,836 |
| Application of funds | | | | | | | | | | | | | | | |
| Purchase of fixed assets | 262 | 37 | | | | 39 | | | | 9 | 108 | 227 | 1,042 | 650 | |
| Repay long-term debt | | | 799 | 493 | 478 | 561 | 111 | 102 | 111 | 122 | 133 | 97 | 55 | 55 | 55 |
| Dividends paid | | | 181 | 173 | 229 | 290 | 318 | 308 | 377 | 442 | 513 | 1,387 | 2,857 | 5,340 | 8,453 |
| Tax paid | | 15 | 84 | 103 | 128 | 158 | 175 | 192 | 251 | 290 | 331 | 919 | 1,868 | 3,528 | 5,574 |
| | 262 | 52 | 1,064 | 769 | 835 | 1,048 | 604 | 602 | 739 | 863 | 1,085 | 2,630 | 5,822 | 9,573 | 14,082 |
| Movement working capital | (3) | (7) | (11) | (11) | (10) | (12) | (7) | (14) | (10) | (12) | (20) | (24) | (40) | (49) | (50) |
| Movement net liquid funds | 229 | 259 | 84 | 5 | 28 | (19) | 66 | 169 | 140 | 124 | 6 | (10) | (712) | (142) | 704 |

**Table 3 Eurotunnel Financial Projections**
*Revised Cash Flow Projections*

| | 1993 £m | 1994 £m | 1995 £m | 1996 £m | 1997 £m | 1998 £m | 1999 £m | 2000 £m | 2001 £m | 2002 £m | 2003 £m | 2013 £m | 2023 £m | 2033 £m | 2041 £m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Finance | | | | | | | | | | | | | | | |
| Issue of share capital | | 52 | 25 | | | | | | | | | | | | |
| Issue of long-term debt | 321 | | 776 | 352 | 361 | 452 | | | | | | | | | |
| Repay long-term debt | | | (799) | (493) | (478) | (561) | (111) | (102) | (111) | (122) | (133) | (97) | (55) | (55) | (55) |
| | 321 | 52 | 2 | (141) | (117) | (109) | (111) | (102) | (111) | (122) | (133) | (97) | (55) | (55) | (55) |
| Investment | | | | | | | | | | | | | | | |
| Purchase of fixed assets | (262) | (37) | | | | (39) | | | | (9) | (108) | (227) | (1,042) | (650) | |
| Operations | | | | | | | | | | | | | | | |
| Operating cash flow before interest | 399 | 610 | 669 | 729 | 793 | 854 | 935 | 1,005 | 1,091 | 1,177 | 1,262 | 2,581 | 4,937 | 9,061 | 14,170 |
| Interest (net) | (229) | (351) | (322) | (307) | (291) | (277) | (265) | (234) | (212) | (190) | (171) | 39 | 173 | 370 | 616 |
| Tax paid | | (15) | (84) | (103) | (128) | (158) | (175) | (192) | (251) | (290) | (331) | (919) | (1,868) | (3,528) | (5,574) |
| Dividends paid | | | (181) | (173) | (229) | (290) | (318) | (308) | (377) | (442) | (513) | (1,387) | (2,857) | (5,340) | (8,453) |
| | 170 | 244 | 82 | 146 | 145 | 129 | 177 | 271 | 251 | 255 | 247 | 314 | 385 | 563 | 759 |
| Increase in cash | 229 | 259 | 84 | 5 | 28 | (19) | 66 | 169 | 140 | 124 | 6 | (10) | (712) | (142) | 704 |
| Cumulative cash balance | 229 | 488 | 572 | 577 | 605 | 588 | 652 | 821 | 961 | 1,085 | 1,091 | | | | |
| Original debt | 4,000 | 4,000 | 3,201 | 2,708 | 2,230 | 1,669 | 1,558 | 1,456 | 1,345 | 1,223 | 1,090 | | | | |
| 1995–1998 debt | | | 776 | 1,128 | 1,489 | 1,941 | 1,941 | 1,941 | 1,941 | 1,941 | 1,941 | | | | |
| Debt balance | 4,000 | 4,000 | 3,977 | 3,836 | 3,719 | 3,610 | 3,499 | 3,397 | 3,286 | 3,164 | 3,031 | | | | |
| Debt-cash | 3,771 | 3,512 | 3,405 | 3,259 | 3,114 | 3,024 | 2,847 | 2,576 | 2,325 | 2,079 | 1,940 | | | | |

**Table 4 Eurotunnel Financial Projections**
*Revised and Estimated Cash Flow Projections*

| | RP 1993 £m | RP 1994 £m | RP 1995 £m | RP 1996 £m | RP 1997 £m | RP 1998 £m | RP 1999 £m | RP 2000 £m | RP 2001 £m |
|---|---|---|---|---|---|---|---|---|---|
| Operations | | | | | | | | | |
| Operating cash flow before interest | 399 | 610 | 669 | 729 | 793 | 854 | 935 | 1,005 | 1,091 |
| Interest | (229) | (351) | (322) | (307) | (291) | (277) | (265) | (234) | (212) |
| Tax paid | | (15) | (84) | (103) | (128) | (158) | (175) | (192) | (251) |
| Dividends paid | | | (181) | (173) | (229) | (290) | (318) | (308) | (377) |
| | 170 | 244 | 82 | 146 | 145 | 129 | 177 | 271 | 251 |
| Tax + Interest | (229) | (366) | (406) | (410) | (419) | (435) | (440) | (426) | (463) |
| Operating cash flow-interest-tax | 170 | 244 | 263 | 319 | 374 | 419 | 495 | 579 | 628 |

| | RP 2002 £m | RP 2003 £m | EP 2004 £m | EP 2005 £m | EP 2006 £m | EP 2007 £m | EP 2008 £m | EP 2009 £m | EP 2010 £m | EP 2011 £m | EP 2012 £m | RP 2013 £m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1,177 | 1,262 | 1,356 | 1,456 | 1,564 | 1,680 | 1,805 | 1,939 | 2,083 | 2,237 | 2,403 | 2,581 |
| | (190) | (171) | (150) | (129) | (108) | (87) | (66) | (45) | (24) | (3) | 18 | 39 |
| | (290) | (331) | (367) | (406) | (450) | (498) | (552) | (611) | (676) | (749) | (830) | (919) |
| | (442) | (513) | (567) | (626) | (691) | (764) | (844) | (932) | (1,029) | (1,137) | (1,256) | (1,387) |
| | 255 | 247 | 272 | 295 | 315 | 332 | 344 | 351 | 353 | 348 | 336 | 314 |
| | (480) | (502) | (517) | (535) | (558) | (585) | (618) | (656) | (700) | (752) | (812) | (880) |
| | 697 | 760 | 839 | 921 | 1,007 | 1,095 | 1,188 | 1,283 | 1,382 | 1,485 | 1,592 | 1,701 |

RP = Revised Projection
EP = Estimated Projection

fairly closely to the assumed growth rates used by Eurotunnel (for instance with regard to projected dividend growth—see note 4) and it is believed they portray the trend of future cash flows consistent with the information[5] contained in the *Offer for Sale*.

The published financial projections do not disclose detailed yearly information over the construction period (1988–1993). Hall (1980, p. 7) refers to cost escalation on such major projects as Sydney Opera House and Concorde where costs (at current prices) escalated by factors of 14 and 7 respectively over periods of 15 years and 14 years respectively. Interestingly, Hall states that

> One project (British Rail's high-speed link from London to the Channel tunnel. . .) was reported as having doubled in cost, to £350,000,000 in only six months; it was then axed by the British government.

Projected information on an annual basis over the construction period would be relevant in assisting readers to monitor the size and implications of any cost overruns, yet this is not given in the *Offer for Sale*.

Figure 1 shows data for operating cash flow, taxation paid, and net interest from Table 4. AB represents operating cash flow based on Eurotunnel published financial projections for 1994–2003. BC represents an estimate by the author of operating cash flow from 2003–2013, assuming steady annual growth rates. PQR represents net interest on a cash basis over the period 1994–2013. XYZ represents taxation on a cash basis over the period 1994–2013. LMN represents the combined total for taxation and net interest over the period 1994–2013. The increasing gap between ABC and LMN represents the area of management discretion in deciding the relative proportion of dividend payments and loan repayments.

## Depreciation policy

Table 1 shows that payments to shareholders in the Eurotunnel project are highly dependent on the depreciation policy. This is confirmed by the prospectus which states: 'The Directors intend that

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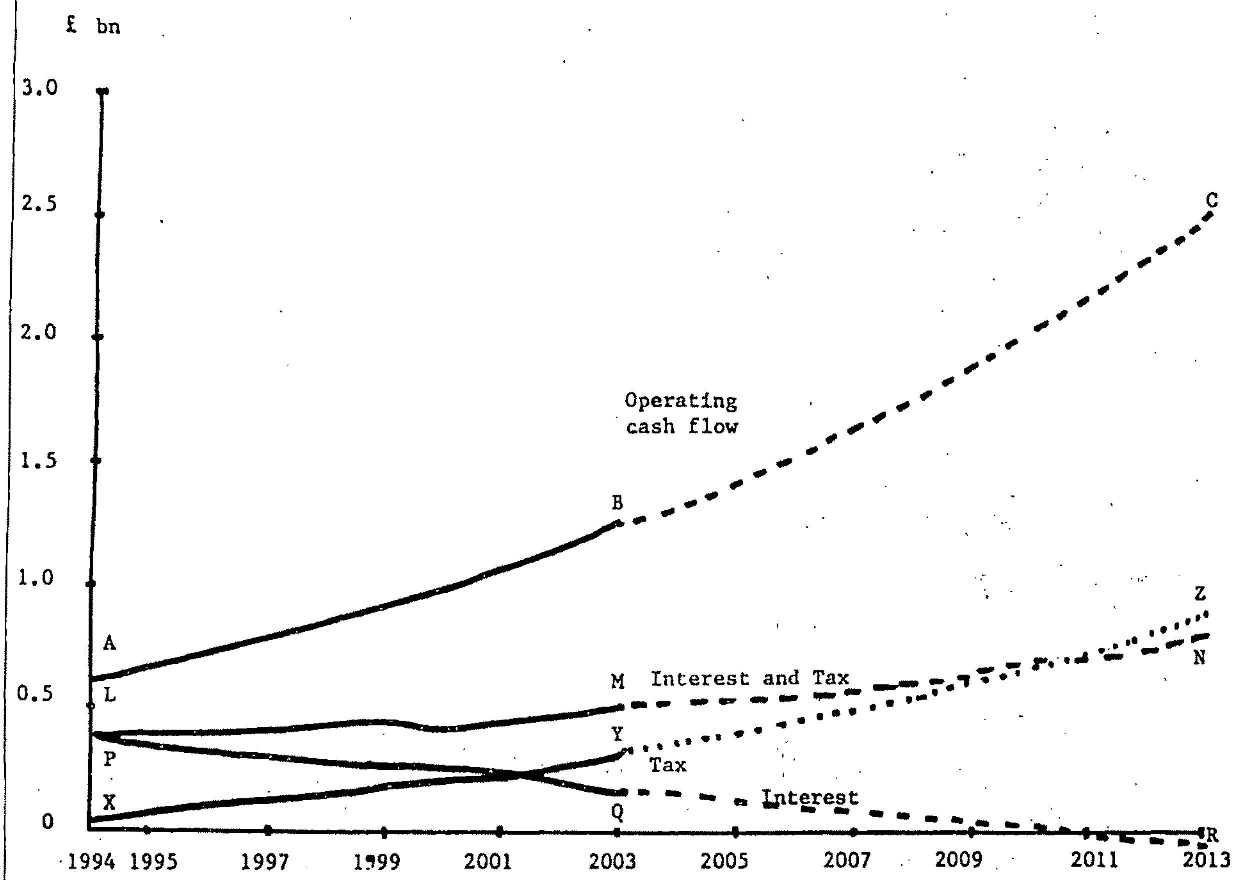
[5] It is important to note that the published financial projections are stated in money terms and assume an annual inflation rate of 6% from 1991 until the end of the Concession.

Figure 1 Comparison of Operating Cash Flow, Interest and Taxation



substantially all of Eplc's and Esa's available distributable profits will be paid out as dividends' (Eurotunnel, 1987, p. 36). Depreciation complies with the statutory and accounting requirements in the UK and France, and the historical cost of fixed assets will be divided equally between CTG and FM and recorded in their books. French accounting rules provide little flexibility in the determination of depreciation rates, and the *Offer for Sale* (p. 53) states that the depreciation charge in the books of FM will be adjusted to allow for changes in replacement prices, but no such adjustments will be made in the books of CTG.

As a result of the two different depreciation policies used in the books of CTG and FM, the two measures of income are prepared on different bases and are therefore not additive. This situation is not unique to Eurotunnel and can arise, for example, in consolidated accounts if subsidiaries follow different depreciation policies. Nevertheless the depreciation policy of Eurotunnel does seem to undermine the justification for regarding the combined measure of income as a meaningful indication of changes in shareholder wealth. The reported profit figure represents a legal constraint over dividend payments and has little to do with any economic definition of changes in wealth.

But if CTG were to follow French accounting rules then overall depreciation charges would be higher and dividend payments over the life of the Concession would be lower. If FM were to follow UK accounting rules then overall depreciation charges would be lower and therefore dividend payments over the life of the Concession would be higher. It could be argued that the depreciation allocation is useful to the Eurotunnel Group because it sets the upper bound on the profits which the Group may legally distribute as dividends. It also fulfils a purpose useful to the Group in that it helps to distance the Directors of Eurotunnel from the consequences of their dividend distribution policy. The effect of the depreciation policy on dividends is considered in the section 'Dividend Policy'.

## Taxation

Eurotunnel will pay taxation on its revenues to the UK and French governments. The projected post-tax income measure is calculated after carrying out two distinct allocation procedures. For CTG, deferred taxation will be provided for significant timing differences expected to reverse in the foreseeable future (*Offer for Sale*, p. 53). For FM, however, due to French accounting rules, no deferred taxation will be provided. An interesting feature of the profit projections is that for the first 6 years of the project (1993 to 1998) provision of taxation amounts to £273m, whereas from the cash flow projections tax payments over the same period are projected at the much higher figure of £488m. This is the opposite of normal expectations in a newly established business operation and the most probable explanation is that in the early years of operation, mainstream corporation tax is not sufficiently high to absorb advance corporation tax (ACT) payments resulting from dividend payments. Although these ACT payments will, in time, be offset against mainstream corporation tax payments in later years the cash flow data highlight more clearly the cost of paying out the particular stream of dividends between 1995 and 1998, i.e. the opportunity cost of interest forgone on ACT payments which temporarily cannot be offset against mainstream corporation tax.

Cash balances will undoubtedly increase in Eurotunnel at a rate far in excess of any conceivable working capital requirements.[6] This has important implications for shareholder wealth. Assuming the absence of legal constraints over dividend policy, it is reasonable to ask if shareholder wealth would be increased through a different distribution policy. Appendix 1 shows that a shareholder would prefer an early distribution if:

$$r_b > r_a(1 - T)/(1 - t)$$

where:

$r_b$ = interest rate received by individual on surplus cash

$r_a$ = interest rate received by company on surplus cash

$T$ = corporate tax rate

$t$ = personal income tax rate

For example, let us suppose that the rate of corporate tax ($T$) is 35%, the rate of personal income tax ($t$) is 25%, and the rate of interest earned by Eurotunnel is as stated in the *Offer for Sale* (i.e. 8.5% p.a.). The shareholder would be indifferent when $r_b = 0.085(1 - 0.35)/(1 - 0.25) = 7.37\%$. Thus, provided the shareholder can earn interest on surplus cash balances at the rate of at least 7.37% p.a., the shareholder would be in favour of receiving dividends sooner rather than later.

## Dividend policy

One benefit accruing to the directors of Eurotunnel is that the dividend policy appears to be reasonable and objective. That is, it is based on future revenues and what the company can 'afford'. The directors will probably escape pressure from institutional investors and others to increase the dividend payout by arguing that the company cannot pay out more than it has 'earned'.

Although the Eurotunnel allocations are a pragmatic device for minimising conflict over choice of an appropriate dividend policy, they are not a satisfactory method for determining a measure which purports to deal with the complex issue of finding an optimal dividend policy. In the case of Eurotunnel an appropriate dividend policy is largely determined by three factors: (a) the existing cash balance, (b) the existing debt balance, and (c) expectations of future net cash inflows. One result of the depreciation policy adopted is that an increasing fund of cash is set aside over the period of the Concession. Since the *Offer for Sale* assumes that surplus cash balances will be invested to earn a rate of interest of 8.5% per annum and the projected net interest receivable in the final full year of the Concession (2041) is £616m, this suggests a cash accumulation at the end of 2041 of over £7bn.

The deferred tax policy bears some similar characteristics to the depreciation policy in that cash will effectively be retained in the earlier years to be paid out in the later years. Unlike the depreciation policy, however, the balance on the deferred tax account should reduce to zero by the end of the Concession. (This contrasts with the accumulated depreciation which will have allowed a steady build up of cash by the end of the Concession.)

Table 1 shows that the profit figures follow a fairly smooth pattern, allowing Eurotunnel to pay a stream of dividends which generally increases steadily over the years. However, it is important to recognise the limitations of the income stream which has been calculated. The income figures are of secondary importance to the true cash flows. For the shareholders, the 'bottom line' is really the future dividend stream. This is acknowledged in the *Offer for Sale* where the directors calculate the net present value of the future dividend stream.[7] Accruals-based financial reports have to be regarded as suspect because they allow directors the possibility of choosing, *first*, the desired pattern of future dividend payments and, *second*, a suitable depreciation policy to allow them to achieve desired patterns of dividend payments.

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[6] The published financial projections show relatively modest working capital requirements over the Concession. Apart from the possible need to carry some stores for repairs and maintenance, Eurotunnel should be in the enviable position of having most of its revenues paid in advance or at the point of travel. Bad debts, for instance, should not present a problem to the management of Eurotunnel.

[7] See Arnold and Wearing (1988, p. 60), where the calculation of present value by Eurotunnel is criticised on the grounds that future dividends are discounted back to the start of operations and *not* to the date of the *Offer for Sale*.

Cash flow reporting has been argued to possess the desirable attribute of objectivity[8] so a more straightforward approach would be for the directors to publish simply the projected cash flows and subsequently to choose a dividend distribution policy. The justification of a dividend policy *solely* in terms of a single income measure, itself composed of arbitrary accounting allocations, is curious since a rational dividend policy needs to be justified in terms of past and anticipated future cash inflows and outflows, and the liquidity requirements of Eurotunnel Group.

The depreciation policy positively gives the management a degree of flexibility in choice of options as a result of the cash build up. This is seen more clearly in a cash flow report than in the traditional accruals statements. For example, investing surplus cash in short term securities might indicate that management is keen to branch out into alternative ventures, and this is discussed further in the final section.

## Loan finance

Conditions for the original loan facility are stringent. Approximately 70% of the equity must be spent before any of the loan capital facility can be taken up. Also the banks need to be reasonably satisfied with the construction progress before granting further finance.

The lending banks will have security over all the assets of Eurotunnel, including the benefit of the Concession. Apart from limited exceptions, Eurotunnel will not be able to carry on activities other than the project, while any of the original debt remains unpaid. Cover ratios will be used by the banks to determine whether Eurotunnel may proceed with certain courses of action, for instance further drawings under the Credit Agreement or the payment of dividends. As an example, up to the year 2005 a bank debt cover ratio will be calculated as the present value of the forecast net cash flow to 2005 divided by the amount of debt due under the Credit Agreement (for the precise details of the calculation, see *Offer for Sale*, p. 50). If this cover ratio is less than 1.25 then the banks will be able to restrict Eurotunnel's dividend distribution.

It is important to stress that the banks, who are in a powerful position *vis à vis* Eurotunnel see their information requirements in terms of forecast cash flows and *not* in terms of an income measure. If the interest of the banks is best served by cash flow information, it is reasonable to ask why the other parties are also not entitled to such information.

Eurotunnel intends to achieve full repayment of the original loan facility by November 2005 and over the period 1995–1998 Eurotunnel will take out further debt amounting to £1,941m (see Table 3). The additional debt will help to pay off the original debt of £4bn, but will also maintain the level of dividends and this is expressly stated in the *Offer for Sale* (p. 35). The reported income measure is being asked to do too much. Not only is it expected to provide a measure of what can be 'fairly' paid out by way of dividend, it is also being asked to indicate what is appropriate to be paid out given the financial structure of the Group.

For the loan creditors, therefore, the most relevant information is that which can help them judge if cash inflows will be sufficient to meet interest payments as well as repayment of the initial debt. The steady build up of cash balances provides a measure of certainty should some major event occur part way through the life of the project, for example unforeseen competition from ferries, some natural disaster, or the opening of a second Eurotunnel.[9]

In Figure 2, AB shows Eurotunnel's projected debt balance over the period 1993–2003. Data are not provided by Eurotunnel to show the repayment of debt in each of the years 2004–2012. If a regular pattern of debt repayment over the remainder of the Concession is assumed, then the linear path BC would be followed. (C represents a debt balance of approximately £2,250m in 2013.) Alternatively, if Eurotunnel decided to repay all its debt by 2013, then a regular pattern of debt repayment would follow the path BD. Unless Eurotunnel decides to incur net *additional* debt after 2003, it seems that the most likely pattern of debt repayment would lie within the triangle BCD.

XY shows Eurotunnel's projected cash balance over the period 1993–2003, and the most likely pattern of cash build-up would lie within the triangle YNZ. YN shows the pattern of movement on cash balance if all debt is repaid by 2013. In

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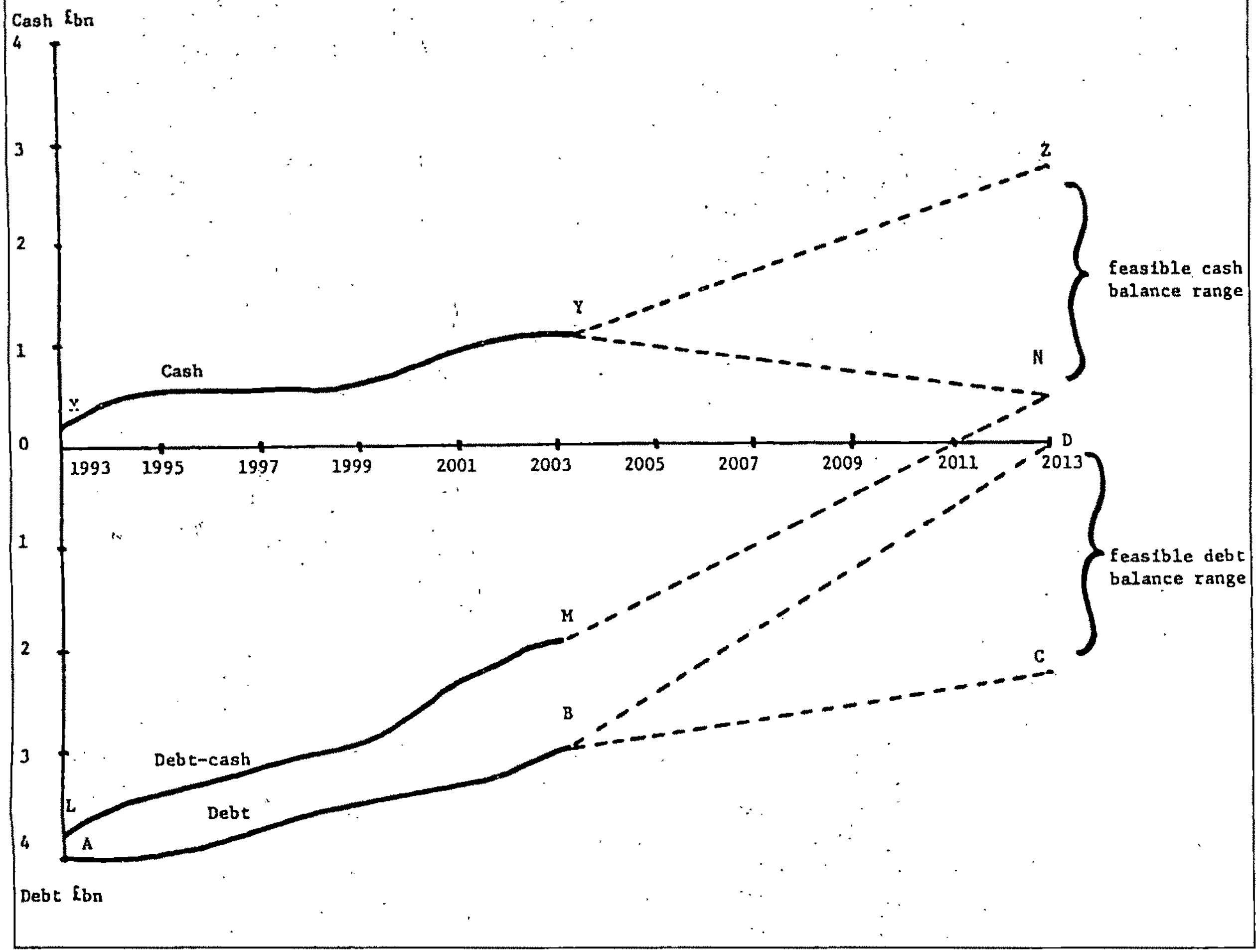
[8] See for instance Lee (1984, p. 92) who argues that the 'avoidance of time allocations minimizes the uncertainties resulting from an accounting for arbitrarily measured data. Although not eliminating subjectivity entirely from the financial reporting function, cash flow reporting does appear to introduce a greater degree of objectivity in the measurement process than is the case with allocation-based systems'. Although Egginton (1984) and Rutherford (1982) both argue that management has scope to manipulate reported cash flows, in the case of Eurotunnel, given that working capital requirements are not substantial, it would seem that the scope for manipulating reported cash flows is relatively limited and therefore that objectivity would be enhanced by reporting cash flows.

[9] Although the financial projections were made by Eurotunnel on the assumption that a second fixed link would not be built before the end of the Concession period, Eurotunnel has a first option to build a second link. However, if by 2010 the UK and French governments have not reached agreement with Eurotunnel to build a second link, they may issue an invitation to others to construct a second fixed link which could operate from 2021 onwards.

**Figure 2 Comparison of Debt Balance and Cash Balance**



2013 the balance of cash would be approximately £460m[10] (represented by N in Figure 1). On the other hand, if Eurotunnel follows the pattern of debt repayment BC, then the pattern of cash balance would be YZ where Z represents a cash balance of approximately £2,710m (i.e. £460m + £2,250m). It seems that the most likely pattern of movement on cash balance would lie, therefore, in the triangle YZN.

LM shows the pattern of debt-cash balance over the period 1993–2003. On the assumption that the movement over the period 2003–2013 is linear, MN shows the possible path over the period 2003–2013. Thus it can be seen that accumulated cash will equal outstanding debt by about the end of 2011. The cash flow data, from which Figure 2 is derived, clearly illustrate the considerable extent of managerial discretion to determine outstanding debt and cash balances.

## Discussion and conclusions

An examination of the financial characteristics of the Eurotunnel project indicates that the *Offer for Sale* could usefully contain additional cash flow information. This would provide relevant information to shareholders, and it is clear from the *Offer for Sale* that such information will be provided on both a historic and forecast basis to loan creditors. It should also be possible to extend the arguments in this paper to other areas which have traditionally been the prerogative of the public sector. For instance, if the government encourages private sector investment in toll roads and in the railway network by granting concessions for fixed periods, cash flow reports could in a similar manner provide useful information.

The first objective of this paper was to question the use of depreciation in a long term construction project and this paper has attempted to show that depreciation is provided essentially to fulfil statutory and quasi-statutory requirements but is not particularly relevant for decision making purposes. This rationale is supported by knowledge of the banks' reliance on cash flow based cover ratios. The fact that depreciation will be charged to the project is, perhaps, a signal that the promoters do not intend the Group to have a finite existence. However, the depreciation charges are probably 'politically' useful to management since management is thereby seen to be calculating its dividend policy in an apparently reasonable and rational manner.

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[10] The Eurotunnel published projection for 2013 shows interest receivable of £39m. A cash balance of £460m earning interest at the rate of 8.5% p.a. would generate interest of £39m.

The above analysis fits well with aspects of the positive accounting literature and interesting parallels can be drawn with the development of railway accounting in the nineteenth century. There is every chance that Eurotunnel will prove to be a successful venture and it is therefore possible that Eurotunnel could attract criticism if its tariffs are widely regarded as being 'excessive'. Consequently it would be in management's interest to report depreciation as a charge against profits. Watts and Zimmerman (1986, p. 348) argue that concern over excess profits by railway companies in the nineteeth century resulted in a demand for the application of accounting rules on a consistent basis:

> . . . because rate regulation was justified in terms of restricting the economic profits of monopolists or eliminating 'ruinous' competition, regulation created a demand for justifications arguing for depreciation to be treated as an annual charge to profits.

The fact that Eurotunnel will be providing detailed cash flow information to its loan creditors but not to its shareholders may partly reflect a desire to minimise political costs in terms of government intervention over competition policy since the projection of 'large' surplus cash balances could be embarrassing.

The second objective of this paper was to provide additional support for cash flow information. What the revised data in Table 3 clearly show is that in the early years (1995–1998) Eurotunnel will need to refinance debt partly to pay dividends, but in the later years Eurotunnel could comfortably increase dividends without recourse to further borrowing. On this point we should be critical of statutes which tie dividends to accounting profits. It was shown how the dividend policy in the years 1995–1998 would result in relatively heavy taxation *payments* in these years. The cash flow data highlight more clearly the 'economic' position and this is consistent with criteria (1) and (2) in the introduction.

Perhaps the most interesting question concerns the nature of the operations of Eurotunnel, once it is no longer constrained by the conditions imposed by the original Credit Agreement. If the Group is no longer allowed to continue operating the Channel Tunnel system after 2042 the Group could voluntarily liquidate and return to the shareholders assets representing their nominal share capital and accumulated reserves, and the articles of Eplc and Esa refer to this possible course of action. But it is unlikely that liquidation would take place in 2042. Given the administrative structure which would exist at that time, it is highly probably that the then directors would attempt to shift the activities of the Group into alternative areas (if they had not done so already).

How might the Group use the increasing cash surplus? Eurotunnel could become involved in a number of related ventures. Firstly, although Eurotunnel rules out the possibility for the purposes of its cash flow projections, it may want to construct an additional tunnel in the next century. Secondly, it could use its cash balance in reducing tolls as part of a strategy to bankrupt or perhaps buy out the ferry operators. Thirdly, Eurotunnel could purchase ferries itself to compete with the existing ferry operators. Fourthly, it may wish to be able to reduce its tolls at a critical period to discourage another consortium from building a competing tunnel. Finally, it could use the cash balance to pursue other, unrelated, industrial or commercial ventures. Eurotunnel could possibly become one of the major commercial enterprises in the Europe of the early 21st century.

Reporting cash flows provides an alternative, dynamic dimension to the opportunities and problems facing the Group. The existence of substantial cash balances would help Eurotunnel achieve its pricing objectives, and reporting this information would provide insights into the types of tactics which could be pursued by management. Simmonds (1982, p. 211) describes these tactics in the context of strategic management accounting:

> When price is seen as a key element in strategic positioning in the industry, the possibilities of setting even higher prices and leading competitors upwards step by step, or undercutting them and perhaps squeezing one out, are immediately raised.

In summary, the published financial projections give the appearance that Eurotunnel will exist simply to collect tolls and pay out all net revenues as dividends at the earliest opportunity. The revised cash flow data show the reality, which is that Eurotunnel has the potential to be a quite different organisation. Cash flow data highlight the courses of action available to the Group and this dynamic aspect is consistent with the third criterion referred to in the introduction. Cash flow information alone cannot provide all the answers, but at least it can help to point out the sorts of questions which shareholders (and policy makers) should be asking.

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## Appendix 1

Suppose that a company needs to choose whether to pay out an additional dividend to shareholders, the alternative being to retain the cash to earn interest. Assume that interest and taxes are paid at the end of each accounting year, and that under the imputation system advance corporation tax can be set off immediately against mainstream tax liability. The value of a distribution to a shareholder at the end of $n$ periods would be:

$$V_a = x(1 + r_a(1 - T))^n$$

where:

$V_a$ = value to shareholder of a single and final distribution at end of $n$ years.
$x$ = distribution forgone at beginning of $n$ years.
$r_a$ = annual interest rate received by company on surplus cash balances.
$T$ = corporate tax rate.

But if the shareholder were to receive the distribution at the beginning of $n$ years, assuming this amount was invested, then at the end of $n$ years the shareholder would have accumulated:

$$V_b = x(1 + r_b(1 - t))^n$$

where:

$V_b$ = value to shareholder of £$x$ plus accumulated interest at end of $n$ years.
$x$ = distribution received at beginning of $n$ years.
$r_b$ = interest rate received by individual on surplus cash balances.
$t$ = personal income tax rate.

A shareholder would be indifferent between receiving $x$ at the beginning of the period or receiving $V_a$ at the end of the period when $V_a = V_b$. Since

$$V_a = x(1 + r_a(1 - T))^n$$

and

$$V_b = x(1 + r_b(1 - t))^n$$

then the shareholder is indifferent when:

$$x(1 + r_a(1 - T))^n = x(1 + r_b(1 - t))^n$$

$$r_a(1 - T) = r_b(1 - t)$$

$$r_b = r_a(1 - T)/(1 - t)$$

So the shareholder would be in favour of receiving a distribution at the start of the period when:

$$r_b > r_a(1 - T)/(1 - t)$$

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# The Development of Legal Disclosure Requirements: the Case of Charitable Donations

**Christopher J. Cowton***

**Abstract**—The requirement that companies disclose the extent of their charitable contributions is an unusual feature of British company law. The purpose of this paper is to trace the development of the requirement from the opinion of the Jenkins Committee on company law reform, that no separate requirement be introduced, through to its appearance in the Companies Act 1967. Drawing on records of Parliamentary debates for the details of the views expressed and the arguments advanced, the paper demonstrates how a Labour Government's desire to have political donations revealed led to the introduction of mandatory disclosure of charitable contributions. The paper is thus a case study of the making of the law relating to financial disclosure.

Company law enacted by Parliament occupies a central position in the teaching and practice of accounting. Yet, while recent years have witnessed increased interest in the process by which accounting standards emerge, relatively little attention has been paid to the formation of modern, as opposed to historical, disclosure legislation in Britain. The purpose of this paper is to trace the development of the requirement to disclose charitable donations from its rejection by the Jenkins Committee, through its omission from the subsequent Companies Bill introduced some years later, to its appearance in Section 19 of the Companies Act 1967.

The essence of the requirement, now contained in Part I of Schedule 7 of the Companies Act 1985, is that, if the sum of payments for political and charitable purposes exceeds £200[1] in a financial year, the company must disclose the totals given for the separate purposes. The figures are to be published in the directors' report which accompanies the annual accounts. Any recipient of political contributions from the company amounting to more than £200 in a year must be named and the sum stated, but no such details regarding charitable donations need be disclosed.

## The Jenkins Report

The Companies Act 1967 was preceded, like a number of other major pieces of legislation before it, by a review of company law. In December 1959, the President of the Board of Trade, as a member of a Conservative Government, had appointed a committee under the chairmanship of Lord Jenkins, *inter alia*, to 'review and report upon the provisions and workings of the Companies Act 1948' (quoted in Magnus and Estrin, 1967). The establishment of the Committee was a response to changed business practices and the public's view of them (*Economist*, 31 October 1959). The author of an article in the *Barclays Bank Review* (February 1960) considered the Committee's appointment such a relatively short time after the passage of the Companies Act 1948 to be a significant commentary on changes in the structure of economic life over the previous decade. According to the *Economist* (23 June 1962), 'The perplexities that were worrying the British public at the end of 1959 had much to do with the feeling that companies and their managements were largely irresponsible both to society and to their shareholders for what they did, and that self-perpetuation through ploughed-back profits and self-appointment through a top management network made them beholden to no one'. A similar view was expressed by Douglas Jay (1962) who, as President of the Board of Trade, was to be closely involved in the passage of the Companies Act 1967.

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*The author is university lecturer in management studies, Oxford University, and fellow in accounting, Templeton College, Oxford. Grateful thanks are due to the Institute of Chartered Accountants in England and Wales for the provision of funding for the research project from which the present paper developed (see Cowton, 1986), and to Professor Richard Macve for his support and guidance; also to Anne Loft and Eamonn Walsh for helpful comments. All views expressed, and all errors and omissions, remain the responsibility of the author.

[1] The threshold figure in 1967 was £50, but was raised by The Companies (Directors' Report) (Political and Charitable Contributions) Regulations 1980 (S.I. 1980 No. 1055).

One of the issues which the Jenkins Committee considered was the question of political and charitable donations, regarding which it received three kinds of evidence (Company Law Committee, 1962, para. 50):

(a) whether political donations should be permitted;
(b) whether statutory powers should be conferred on every company (unless it provided to the contrary) to make charitable donations of every kind;
(c) whether such donations should be shown separately in the accounts.

Evidence was taken from some fifty parties over twenty days between September 1960 and March 1961. The product of this activity, over 1,600 pages of material (*Minutes of Evidence*...), consists of a record of the oral questioning together with the previously submitted written memoranda. A variety of interests was represented (Guthman, 1963), though there was comparatively little socialist or radical input (Wedderburn, 1965). Of the twenty-three memoranda containing comments or recommendations regarding donations, five recommended no change in the law,[2] while discussion in twelve others was limited to the power to give rather than the question of disclosure.

Recommendations for disclosure were contained in six of the memoranda. The Stock Exchange, without giving reasons, suggested that the total given for charitable and political purposes should be disclosed. A similar stance was taken by the Association of Investment Trusts which, while holding a positive view of donations, commented that they were made with shareholders' money. The *Economist* magazine also recognised that there were arguments (both in terms of excessive charity and possibly too little) for some disclosure. Lord Piercy, Chairman of the Industrial and Commercial Finance Corporation Limited, which at that time had shares and long-term investments in about seven hundred companies, was not keen on donations, particularly the political kind, and thought that the total should be disclosed. The Trades Union Congress (TUC) was similarly very much against political donations, but recognised the desirability of gifts for *bona fide* charitable purposes, provided that full disclosure was made in the annual report. During questioning, the TUC representatives added that shareholders and the public were entitled to know when considerable sums were donated and so contributions above a certain amount should be listed. Professor E. V. Morgan, an economist, considered that, on balance, charitable donations should not be restricted and that, while trades unions continued to levy their members in support of the Labour Party, nor should political donations. However, he thought that it might be desirable to publish lists of both kinds of donation in the annual report, though when being questioned he added that, to save labour, only those above a certain limit, say £1000, should be included.

The only evidence explicitly against disclosure came during questioning, not in memoranda. The Chairman of J. Lyons & Company Limited, Mr. I. M. Gluckstein, was against disclosure, but did not feel very strongly about it. The Institute of Directors representative argued that, assuming that charitable donations were properly in the direct or indirect interest of the company, there was no special reason to disclose them when compared with other items of expenditure.

Thus there was some limited support for the aggregate or detailed disclosure of donations, but most parties presenting evidence were more interested in the question of the power of companies to give. Overall, there was considerable support for charitable donations made in the company's direct or indirect interest, and it seems likely that those who advocated no change in the law considered the practice to be established and accepted.

The ensuing report, which was 'considerably more comprehensive than any of its forerunners' (Pickering, 1967, p. 385), was presented to Parliament in June 1962. The Committee concluded that the question of whether political donations should be permitted was a constitutional issue and not one of company law, while it was thought that the Courts would accept the practice of making general charitable donations. It explicitly rejected the possibility of introducing a special disclosure requirement, concluding in the following terms (para. 53):

> It has been suggested that donations should be shown, in aggregate, in company accounts. We recognise that in some circumstances this information may be of interest to shareholders—and indeed, that if donations are relatively large the obligation ... to give in the accounts a true and fair view of the profit or loss of the company may now require their disclosure. But we do not think donations are a sufficiently important item in most company accounts to justify an express, general requirement to disclose them.

## The first Bill

It was not until February 1966 that the Government—by this time a Labour administration—introduced a Companies Bill. Contrary to the apparent conclusions of the Jenkins Committee,

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[2] The Association of British Chambers of Commerce, the Council of Scottish Chambers of Commerce, the Federation of British Industries, the Institute of Directors and the National Chamber of Trade. Whether they had disclosure or just capacity issues in contemplation is not clear from the context.

Clause 16 of the Bill proposed the disclosure of political contributions exceeding £25. (Wedderburn (1965) had argued in a Fabian Tract that the public interest required the disclosure of political donations by companies enjoying limited liability. He made no mention of charitable donations.) A number of other clauses were also concerned with disclosure, for example of exports and of directors' emoluments, but no reference was made to charitable donations.

The clause relating to political payments was subjected to considerable criticism (Jones, 1967a, 1970). Described as the 'red rag to the Tory [Conservative] Bull' (*Economist*, 26th February 1966), it was perhaps the most controversial part of the entire Bill (Sclaverano, 1966; Leigh, 1968). Anderson (1966) claimed that the published data would be of no value to shareholders. The provision was widely seen as politically motivated and sectarian[3] (Naish, 1967; *Economist*, 12th November 1966) and therefore inappropriate to company legislation (Jones, 1967b; Kirkpatrick, 1966). Jones (1966) considered that accountants would regret the introduction of company legislation into the arena of political controversy.

In introducing the debate on the second reading of the Bill in the House of Commons, the Minister of State at the Board of Trade, Mr. George Darling, referred to the controversy and stated the basis of the case for disclosure:

> I cannot for the life of me understand why honourable Members opposite get so hot and bothered about this very simple request, that companies which subscribe to political funds should tell their shareholders that part of the profits has been used in that way. Surely, in this as in so much else, the shareholders are entitled to know. After all, it is supposed to be their company. They each have a stake in it, and, if the directors want to play at politics with the company's money, they ought in all fairness and honesty to tell the shareholders what they are doing. (725 HC DEB 1965/66 Col. 42)

In opening the reply for the Conservative Opposition, Mr. Anthony (later Lord) Barber suggested that the importance of the Clause to the Government was indicated by the Minister of State's having devoted seventeen minutes to it during a speech of 37 minutes. Mr. Barber also commented that the Clause, in proposing disclosure, was contrary to the advice of the Jenkins Committee. The Minister without Portfolio, however, countered that Para. 53 of the Report (quoted earlier) referred only to charitable donations.

Mr. Peter Shore (Labour) then entered the debate, expressing a concern that some donations to essentially political organisations such as British United Industrialists might not be covered. Therefore donations as a whole, not just political donations, should be considered, especially as directors were disposing of other people's wealth. He continued:

> I do not want to suggest all the subheads, but it should cover donations to charity, education, research and many other things. I would certainly include politics, which would naturally find its proper place in this general and rather enlarged provision for disclosure. (725 HC DEB 1965/66 Col. 68).

Some Conservative speakers (e.g., Sir John Rodgers, 725 HC DEB 1965/66 Col. 86; Mr. Anthony Grant, Col. 108; Mr. J. Bruce-Gardyne, Col. 118; Mr. William Clark, Col. 144) claimed that shareholders might react to the publication of political donations by demanding that their companies contribute more, but there was also some concern that the information might be used in a prejudicial manner in the placing of government contracts (Sir John Vaughan-Morgan, 725 HC DEB 1965/66, Cols. 70-71; Mr. William Clark, Col. 144). A number of Conservative members suggested that the measure was politically vindictive, perhaps being intended to lead to a fall in company donations (Sir John Vaughan-Morgan, 725 HC DEB 1965/66, Col. 71; Sir John Rodgers, Cols. 84-85; Sir Frederic Bennett, Col. 121; Sir Tatton Brinton, Cols. 128-129);[4] in order to avoid this charge the disclosure requirement should be extended to include all donations (Sir John Vaughan-Morgan, 725 HC DEB 1965/66 Col. 71; Sir Frederic Bennett, Cols. 121 and 149)—political, charitable and others.

The Minister without Portfolio, Sir Eric Fletcher, concluded the debate in the following terms:

> In view of what has been said on both sides tonight, I am sure that this disclosure should be extended to charitable organisations. I am very glad to have had the assurance of hon. Members opposite that if that is done they will think it reasonable, and I hope that we shall hear no more about meanness and vindictiveness. (725 HC DEB 1965/66 Col. 149.)

Thus, the disclosure of charitable, in addition to political, contributions re-entered the arena, having earlier been rejected by the Jenkins Committee and originally ignored in the Government's Bill.

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[3] The Conservative Party receives a significant proportion of its funds in the form of donations from companies. It was not until June 1967 that the Chairman of the Conservative Party announced that the Party would begin publication of the income and expenditure of the central organisation (Bromhead, 1968).

[4] Pinto-Duschinsky (1985) suggests that the disclosure requirement may have had such an effect.

No further progress was made on the Bill before Parliament was dissolved in March 1966, and so it fell before it had completed all the stages necessary for it to become law. An indication of the significance attached by the Government to the disclosure of political donations is provided by the sole comment on the whole Bill in the Queen's Speech (written by the Prime Minister) at the prorogation of Parliament: 'Proposals have been put before you for requiring the public disclosure of more information by companies, including the disclosure of political contributions' (725 HC DEB 1965/66, Col. 2380). No direct mention was made of charitable donations or, indeed, any other proposed disclosure requirement.

## The second Bill

When another Bill was introduced in November 1966 to replace the one that had fallen, it was approximately twice the length, the increase being primarily accounted for by extra clauses aimed at remedying a crisis in the insurance industry. It was introduced in the House of Lords, rather than the House of Commons, in order to make the insurance provisions of the Bill effective as quickly as possible (*Economist*, 26 November 1966). Regarding donations, Clause 18 provided that any contributions over £25 for political or charitable purposes should be listed in the annual report. Thus, not all types of donation were covered, but it was being proposed that details of charitable giving should be disclosed.[5]

In the debate on the second reading of the Bill, some of the issues raised in the earlier House of Commons debate were again mentioned, but it was taken for granted throughout that both political and charitable donations would be disclosed in some form. Some concern was again voiced regarding the possible victimisation of companies shown to be supporters of a particular political party (Lord Erroll of Hale, 278 HL DEB 1966/67 Col. 226). Attention was also paid to the question of listing individual payments for charitable purposes; owing to the large number of donations involved, Lord Erroll of Hale thought that the threshold for disclosing a particular charitable contribution 'should be raised from the present niggardly £25 to something like £125' (278 HL DEB 1966/67 Col. 147) and Lord Byers suggested that it should be altered to about one hundred guineas, or £105 (Col. 158). Lord Milne went further and proposed that donations should be shown in total only, with details being made available to shareholders or others, possibly on request (Col. 199).

The House of Lords Committee Stage of the Bill, at which the detailed provisions were to be considered in greater depth, began in December 1966. No amendments of importance to the disclosure of political and charitable donations were actually passed, but Lord Rhodes, on behalf of the Government, promised to re-examine the provisions of Clause 18 in the light of the arguments presented. In particular, he acknowledged that the threshold of £25 was probably too low (278 HL DEB 1966/67 Cols. 1635, 1639 and 1777), as had been suggested by a number of peers (Lord Erroll of Hale, Col. 1634; Lord Ampthill, Col. 1635). He was less happy with suggestions that, instead of any details appearing in the directors' report, a register should be kept at the company's registered office. So far as charitable donations were concerned, reasons for the alternative of keeping a register had included the need to prevent the directors' report becoming too long (Lord Drumalbyn, 278 HL DEB 1966/67 Col. 1636), the possibility of various parties clamouring for the inclusion of a particular charity (Lord Drumalbyn, Col. 1636; Lord Conesford, Col. 1781) and the belief that supporting charitable endeavour should be considered a normal part of modern business (Lord Polwarth, Col. 1771).

In spite of Lord Rhodes' misgivings, the idea of a register appeared in the relevant clause of the Bill when it reached the House of Commons in February 1967. The requirement to disclose political donations in the directors' report was still included, but the threshold had been raised to £50, both for aggregate donations and for individual political contributions. These changes, according to the President of the Board of Trade, Mr. Douglas Jay, speaking in the debate on the second reading, had been made as a result of representations in the House of Lords and to prevent companies being 'burdened with very long lists of trivialities' (741 HC DEB 1966/67 Col. 364). Little else of import was said about the Clause before the Bill was read a second time.

Twenty-seven sittings were needed for the Commons committee stage of the Bill. Much of the discussion regarding donations centred on the definitions of political and charitable, but these were left relatively open and the only major change by the time the Royal Assent was received on 27th July 1967 was to omit the requirement to maintain a register of individual charitable donations. Thus, it is not necessary to provide a breakdown of the aggregate charitable donations figure, if any, contained in the directors' report.

## Discussion

The disclosure of charitable donations is described by Gray *et al.* (1987) as 'something of an idiosyncracy' (p. 40) and 'one of the peculiarities of

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[5] A joint memorandum on the Bill from three professional accounting bodies expressed 'no view on the overall intention of Clause 18', but drew attention to a 'number of practical problems', in particular in accounting for charitable contributions (The Companies Bill: Joint Memorandum...).

UK company reporting' (p. 98).[6] The foregoing sections have described how this unusual provision came to be a mandatory element of corporate reporting, tracing its development from the negative opinion of the Jenkins Committee to eventual enactment by Parliament.

It was shown that there was little direct interest in the disclosure of charitable donations and an explanation of its appearance in UK company law has to look beyond any possible information content of the disclosure item in isolation. In accordance with the recommendation of the Jenkins Committee, it was omitted from the first Companies Bill of 1966, but it re-entered the political arena as an unintended, but not necessarily undesirable, consequence of the Labour Government's firm wish to have political donations disclosed.

The Conservative Opposition, which felt itself to be under attack through what was widely perceived to be a partisan political measure, argued that the Jenkins Report had recommended against the disclosure of political donations, but the Government, claiming a different interpretation of the relevant paragraph, contended that the Committee had been referring only to charitable donations. It was very difficult for the Opposition to muster further arguments against the clause (*Economist*, 26 November 1966) because of the strength of the arguments—or excuses (Watts and Zimmerman, 1979)—that the Government could draw on, particularly given contemporary concern, as reflected in the establishment of the Jenkins Committee, about the divorce of ownership and control of companies. Faced with a Government which enjoyed a large majority and was highly committed to the clause, there was little impact the Conservative Opposition could have except, perhaps, to expand the requirement, thus mitigating the appearance of political donations.

Some Government supporters also wanted an extension of the original clause contained in the first Bill, apparently to include donations to bodies of a quasi-political nature, although the later amendment dropping the need to name recipients of charitable donations undermined this aim. Thus, any Labour interest in pressing for the disclosure of charitable donations was connected with the presence of the disclosure of political contributions on the parliamentary agenda, not because of a mission regarding charitable donations *per se*; it will be noted that the Government minister had quoted the Jenkins view with apparent approval.

Therefore, the introduction of the 'idiosyncratic' requirement to disclose charitable donations was associated with the aim of a Labour administration to have revealed the level of corporate political contributions, a desire which was seen, by many, as party political and contravening established norms regarding the appropriate scope of company law and its reform.

Such an understanding of the way in which the requirement to disclose charitable donations was established can be contrasted with other accounts of its presence on the statute books. Not surprisingly, given the apparent unimportance of the provision, such accounts tend to be somewhat scarce and rather vague. For example, Benston (1976, p. 103) writes:

> Administration of government and the public's and employees' 'right to know' might require specific information of companies, such as . . . the amount of charitable contributions.

He provides an explanation with a different emphasis in an earlier section of the same book (p. 36):

> The belief that disclosure is desirable for the general economic and social needs resulted in some specific disclosure requirements of the Companies Act 1967, such as the sections calling for disclosure of charitable and political contributions.

Underdown and Taylor (1985, p. 26) similarly point to the importance of changes in the economic and social environment:

> As attention shifted to encompass economic and social needs in addition to capital accumulation, the specific disclosure requirements of company law were changed accordingly. For example, the 1967 Companies Act included disclosure requirements relating to charitable and political contributions, and the value of goods exported.

While the above quotations may reflect issues current during the first half of the 1960s, some of which presumably influenced the agendas and specific contents of the Jenkins Committee and the Companies Act, it is suggested that the introduction of the mandatory disclosure of charitable donations was not directly determined by the circumstances to which the authors vaguely allude. It is difficult to imagine—given the conclusion of the Jenkins Committee, the lack of international parallels and the generally low level of interest in the information since it has been disclosed—that the requirement would have been introduced at any time during the last 25 years had it not been for the desire of the Labour government to have corporate political donations brought out into the open.

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[6] In 1950, New York amended its statute to require its corporations to furnish their stockholders with annual lists of all contributions in excess of $500, indicating amount and donee, but this provision was repealed in 1951 (Thiele, 1954).

## Conclusion

The task of understanding the development of accounting and disclosure requirements can be complex and laborious, involving more than simple deductions from a knowledge of changes in its environment or, more perilously still (Yamey, 1981), from what is believed to have been the spirit of the age, or *Zeitgeist*. Resisting the temptation to view the introduction of the disclosure of charitable donations as a deliberate furtherance of, for example, social reporting, an attempt has been made in this paper to develop a richer and more contextual understanding of the emergence of one element of the current disclosure framework. Central to this account is an awareness of the nature of political funding in Britain, party politics and Parliamentary procedures and behaviour. It would seem that the activities of Parliament are worthy of further study by accounting researchers.

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# The Rationale for Cost Allocation: a Study of UK Divisionalised Companies

**Sayel Ramadan***

**Abstract**—This paper reports the results of an empirical study designed to examine how top management in divisionalised companies perceive central costs allocation for the purposes of performance evaluation. Data for the study were collected from senior management using a questionnaire survey. The empirical evidence shows that top management allocate costs to influence the behaviour of managers to take action in the best interests of the company as a whole. Following from this, top management perceive allocations as being likely to encourage the optimal utilisation of resources. However, top management perceive allocations as being unlikely to reduce both divisional managers' expenditure on perquisites and budgetary slack.

## Background and purpose

Although the issue of central costs[1] allocation for the purposes of performance evaluation has been discussed extensively in the accounting literature, research in this area has focused on developing different proposals to allocate such costs.[2] There is very little systematic work on why cost allocations are being made. One of the main motives which has been suggested in the literature is that central cost allocations influence the behaviour of subordinate managers to take action in the best interests of the company as a whole (Bodnar and Lusk, 1977; Zimmerman, 1979; Blanchard and Chow, 1983; and Horngren and Foster, 1987).

An issue of particular importance to management accountants as well as the designers of cost allocation and performance evaluation systems is whether cost allocation for the purposes of performance evaluation is useful in influencing the behaviour of subordinate managers in such a way that they will be motivated to take action in the best interests of the company as a whole.

The main purpose of this study is to investigate how top management in divisionalised companies perceive central costs allocation for the purposes of performance evaluation. More specifically, the study examines whether the decision to allocate central costs is influenced by behavioural factors.

## Scope of the study

The study is concerned with the allocation of central costs to segments, within the firm, which are organised as divisions.[3] The reason why the study focuses on divisionalised companies is that the issue of cost allocation for performance evaluation is closely related to the divisionalisation of business operations where divisional managers operate semi-autonomous divisions. Under these circumstances, any costs assigned to divisions from some other source become important factors in the evaluation of divisional managers' performance.

## Relevant prior research and research hypotheses

It has been argued that cost allocations for the purposes of performance evaluation are made to influence the behaviour of managers and to motivate them to take action in the best interests of the company as a whole (Bodnar and Lusk, 1977 and Horngren and Foster, 1987).

Building upon this behavioural reason for cost allocation, Zimmerman (1979, pp. 504–521) argued that allocations are made to encourage optimal utilisation of resources. In addition, he suggested that they also induce subordinate managers to reduce their consumption of perquisites. The argument here is that because of the need to report profits of sufficient amounts to satisfy top management, cost allocation would encourage divisional managers to reduce spending on perquisites.

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*The author is assistant professor at Yarmouk University, Irbid, Jordan. He gratefully acknowledges advice from referees.

[1] Central costs are costs incurred at headquarters level for the benefit of two or more components of a company in such a way that it is difficult to trace specific portions of those costs exclusively to individual components. Central costs may be known within the organisation as common costs, corporate indirect costs, central administrative costs, management charges, management fees, central head office costs and so on.

[2] This literature is discussed in Moriarity (1981).

[3] For the purposes of the study a division is defined as any segment within the organisation whose manager is profit accountable.

Blanchard and Chow (1983, pp. 38–41) go further. They demonstrate that the allocation of central costs, using sales revenue as a basis, will reduce divisional managers' tendency to build slack into their performance budgets.

Although the issue that allocations encourage optimal utilisation of corporate resources may be appreciated, it has not been empirically examined. Moreover, it can be argued that cost allocations are unlikely to reduce divisional managers' perquisite consumption. To compensate for the increased costs which result from central cost allocations, divisional managers can manipulate accounting conventions in such a way that they produce adequate profit. In addition, Blanchard and Chow justified their view on the assumption that central costs are allocated among divisions according to sales revenue. Such a view cannot be generalised if different allocation bases are used. Finally, the above studies did not examine[4] in detail whether top management perceive cost allocation for the purposes of performance evaluation as likely to influence the behaviour of managers in a desired direction. They also did not test the propositions that top management perceive allocations as being likely to influence divisional managers' behaviour in such a way that overconsumption of perquisites and budgetary slack will be reduced. Therefore, the following research hypotheses are developed.

*Hypothesis 1:*

Top management perceive that central cost allocation is likely to make divisional managers aware that such costs exist and must be covered by divisional profits.

*Hypothesis 2:*

Top management perceive that the allocation of central costs is likely to encourage optimal utilisation of resources.

*Hypothesis 3:*

Top management perceive that central cost allocation is likely to reduce divisional managers' expenditure on perquisites.

*Hypothesis 4:*

Top management perceive that central cost allocation is likely to reduce divisional managers' tendency to insert slack in their performance budgets.

## Research methodology

To test the hypotheses stated in the preceding section a sample of 296 UK companies was selected at random from *The Times 1000* for the year 1984/85. The population from which the sample was selected was limited to UK based divisionalised and listed companies only. It was considered that unlisted companies were more likely to be reluctant to release information about why they allocate central costs than listed companies.

A questionnaire was developed and mailed to the entire sample. The questionnaires were addressed to the finance directors or other senior executives familiar with cost allocation practices in their companies. The finance director is in the best position to determine the importance attached to cost allocation.

Respondents were asked to provide information about the reasons for and benefits of cost allocation on a five-point Likert-type scale (ranging from 1 = not at all to 5 = extremely significant).

Of the 296 questionnaires returned, five stated that their companies did not have two or more divisions according to the definition of a division given in the questionnaire and two companies had been liquidated. This reduced the sample size to 289 companies. Of the 192 responding companies, 69 companies did not complete the questionnaire, but returned it with a covering letter explaining why they did not complete it. It may be useful for academic researchers to provide a list of the reasons given by such companies (Table 1).

The total number of questionnaires completed and returned was 123, of which three were not usable (a response rate of 42.6%). Most of the questionnaires were completed by the group finance directors and other persons occupying positions requiring a good knowledge of the issue of cost allocation. A number were completed by the group chief accountant, the managing director, the company secretary, and in a few cases by a more specialised function such as systems development manager, planning manager, or the manager of group controls and audit. Table 2 presents the job titles of questionnaire respondents.

Of the 120 companies completing the questionnaire, 69 companies allocated central costs for the purpose of performance evaluation and 51 did not. Those respondents who allocated costs were classified as cost allocators and were used in the study.

In order to support the validity of the results, the data collected was supplemented by data derived from a few semi-structured interviews with the finance directors or financial controllers in ten of the companies.

Finally, a conventional level of significance of 0.05 was used in testing the validity of results

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[4] See also Baumes (1963), Fremgen and Liao (1981), Melrose-Woodman (1974), and Whiting and Gee (1984).

**Table 1**
**Reasons given for not completing the questionnaire**

| Reason | No. of companies | % |
|---|---|---|
| 1. Do not wish to participate | 23 | 33.0 |
| 2. Lack of time and resources | 22 | 32.0 |
| 3. Company policy | 10 | 14.5 |
| 4. Questionnaire does not apply | 10 | 14.0 |
| 5. Company closed | 2 | 3.0 |
| 6. Confidentiality | 1 | 1.5 |
| 7. Completion is qualified by prior payment of an appropriate recompense | 1 | 1.5 |
| Totals | 69 | 100.0 |

achieved by the various statistical techniques of analysis employed. The results obtained and their analysis are presented below.

## Analysis of results

### *Hypothesis 1*

The majority of companies considered the set of reasons provided in the questionnaire of some importance in the cost allocation decision. But as Table 3 shows, the most common reasons were reasons 1 and 6. Over 95% of the companies consider reason 1 to be moderately to extremely significant in the cost allocation decision. This also applies to reason 6 but with a lower percentage (88.3%).

Reason 6, 'to make divisional managers aware that central costs exist... ', shows how much each division contributed to overall group profits. Thus, top management can show divisional managers their total costs (including central costs) so that each divisional manager is aware that central costs exist, and the divisional profits must be enough to cover not only the division's costs, but also a proportion of central costs. This makes divisional managers aware of the true costs of their divisions. According to this reason, it is not enough for top management to find out whether the company is making enough profit, for they also want to know which divisions are making profits and which are making losses and why. This enables management to control both the operating divisions and the group as a whole.

The above reason can be considered as behavioural in nature and it agrees with the view, advocated in the literature, that allocations are made to influence the behaviour of managers.

Reason 1 is also important in the cost allocation decision. The rationale for this reason is that central services which exist primarily to serve divisions are essential to divisional operations. Therefore, they form an actual part of a division's cost of operations. Most of these functions if not provided centrally, or if divisions were independent, would have to be performed by the divisions and the cost would be higher. Thus, top manage-

**Table 2**
**Job title of respondents**

| Job title | No. of respondents | % |
|---|---|---|
| Finance director | 47 | 39.2 |
| Other directors | 2 | 1.7 |
| Financial controller | 22 | 18.3 |
| Chief accountant | 22 | 18.3 |
| Cost accountant | 5 | 4.2 |
| Chairman/Chief executive | 6 | 5.0 |
| Others | 16 | 13.3 |
| Totals | 120 | 100.0 |

**Table 3**
**Reasons for cost allocation**

| | *Percentage of responses* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Reasons provided in the questionnaire* | *Not significant 1* | *2* | *3* | *4* | *Extremely significant 5* | *Mean* | *Std. dev.* | *Total score* | *No. of responses* |
| 1. Divisions would incur such costs if they were independent units or if the services were not provided centrally. | 1.4 | 1.4 | 21.8 | 31.9 | 43.5 | 4.179 | 0.923 | 288 | 69 |
| 2. Divisional managers control the usage of central services. | 30.9 | 22.0 | 27.9 | 11.8 | 7.4 | 2.471 | 1.287 | 165 | 68 |
| 3. To induce divisional managers to take greater interest in a particular central service. | 23.5 | 30.9 | 25.0 | 14.7 | 5.9 | 2.471 | 1.190 | 169 | 68 |
| 4. To stimulate divisional managers to put pressure on central service managers to control costs. | 26.5 | 17.6 | 35.3 | 8.8 | 11.8 | 2.618 | 1.293 | 178 | 68 |
| 5. To stimulate divisional managers to economise in their usage of central services. | 36.7 | 26.5 | 27.9 | 5.9 | 3.0 | 2.103 | 1.081 | 144 | 68 |
| 6. To make divisional managers aware that central costs exist. | 7.3 | 4.4 | 10.1 | 24.6 | 53.6 | 4.145 | 1.204 | 285 | 69 |
| 7. To provide signals on the efficiency of service departments. | 26.2 | 27.7 | 21.5 | 15.4 | 9.2 | 2.569 | 1.323 | 165 | 65 |

ment may perceive that, by signalling to divisional managers that they would have had to incur such costs if they were independent or if the service was not provided centrally, they will generate a greater sense of cost responsibility on the part of divisional managers.

Alternatively, top management may perceive that the allocation of costs is justified on the grounds that divisions would necessarily have to acquire the service from some source or other. The economic argument is that it may be cheaper to provide the service centrally rather than have divisions obtain the service from an external supplier. In this context, it might be argued that, in the short run (where the service is not fully utilised), the cost of the service may be higher than if bought from outside. However, in the long run, so long as optimal utilisation of the service is achieved, the cost should be less than if the service was obtained from an outside source, assuming that the efficiency of the service internally is consistent with that of outside suppliers. Thus, it is conceivable that divisional managers would be expected to prefer to use the centrally provided service rather than to pay a commercial price for an externally provided one.

The least frequently cited reasons were: 'divisional managers exercise discretion over the usage of central services', 'to induce divisional managers to take a greater interest in a particular activity', 'to stimulate divisional managers to economise in their usage of central services', 'allocations stimulate divisional managers to put pressure on service department managers to control the costs of central services' and 'divisional managers control the usage of central services'.

In conclusion, the analysis suggests that there are two major reasons for cost allocation: 'to make divisional managers aware that central costs exist and must be covered by divisional profits' and 'divisions would incur such costs if they were independent'. Both reasons can be considered as behavioural. Therefore, the null hypothesis that top managment perceive cost allocations for the purposes of performance evaluation as being unlikely to make divisional managers aware that central costs exist and must be covered by divisional profits can be rejected.

*Hypothesis 2*

Table 4 indicates that allocations generally are perceived to have some desirable effects in that they contribute to the improvement of the resource allocation process. This occurs through controlling the growth in costs of central services and, to some extent, central general and administrative expenses. This benefit received the highest mean score in Table 4. According to Zimmerman, if central services are provided free, overconsumption will be inevitable. Therefore, cost allocations

**Table 4**
**The desirable effects of cost allocation**

| | Percentage of response | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Not at all* 1 | 2 | *Moderate* 3 | 4 | *Very high* 5 | *Modal response* | *Total score* | *Mean* | *Std. dev.* | *No. of responses* |
| Improve the internal resource allocation process | 13.0 | 21.7 | 36.2 | 21.7 | 7.2 | Moderate | 199 | 2.884 | 1.119 | 69 |
| Reduce expenditure on perquisites | 38.2 | 30.9 | 17.6 | 11.8 | 1.5 | Not at all | 141 | 2.074 | 1.083 | 68 |
| Reduce budgetary slack | 51.5 | 26.5 | 16.2 | 5.9 | — | Not at all | 120 | 1.765 | 0.932 | 68 |

influence divisional managers' behaviour in such a way that optimal utilisation of resources can be achieved. Thus, the null hypothesis that top management perceive allocations as being unlikely to encourage the optimal utilisation of resources can be rejected. As we will see in the last section, this result needs to be empirically examined at divisional level. In particular, divisional managers' perceptions regarding the effect of cost allocation on their tendency to economise in their usage of central services should be examined.

*Hypothesis 3*

The pattern of responses in Table 4 indicates that allocations are perceived as being unlikely to reduce expenditure on perquisites to some extent. The range of response considering cost allocation as an instrument of reducing divisional managers' expenditure on perquisites was from 1 (not at all effective) to 5 (extremely effective). About 69% of the respondents perceive that allocations have little or no influence at all on divisional managers' expenditure on perquisites. The percentage of companies considering allocations of moderate or high extent in reducing managers' expenditure on perquisites was (29.4%). Only one company reported that allocations reduce divisional managers' expenditure on perquisites to a large extent. This may be because divisional managers are likely to be guided by target profits which will be based on their past results, or the results of similar sub-units or an industry average. Therefore, it is unlikely that divisional managers will reduce their consumption of perquisites. In addition, divisional managers can manipulate profit in such a way that they can report higher profits in cases of cost allocation. Thus, the null hypothesis that top management perceive allocations as being unlikely to reduce divisional managers' expenditure on perquisites cannot be rejected (mean score 2.074).

*Hypothesis 4*

The benefit that allocations are perceived by top management as being likely to reduce divisional managers' tendency to insert slack in their performance budgets received the lowest mean score in Table 4 (1.765). This result indicates that the null hypothesis that top management perceive cost allocations for the purposes of performance evaluation as being unlikely to encourage divisional managers to reduce slack in their performance standards cannot be rejected. This result seems to be convincing. The reason is that Blanchard and Chow justified their view on the assumption that central costs are allocated among divisions according to sales revenue, whereas previous empirical studies indicated that firms use a variety of cost allocation bases (including sales revenue) and top management perceive them as being unlikely to encourage divisional managers to reduce budgetary slack. However, Blanchard and Chow's view needs to be empirically examined at divisional level.

In summary, the results of hypotheses 3 and 4 suggest that firms do not allocate costs simply to reduce divisional managers' expenditure on perquisites or to reduce their tendency to insert slack in their performance budgets.

Finally, to test the significance of the differences in the rankings between benefits, and in particular to find out the most significant benefit of cost allocation, the Wilcoxon matched-pairs signed-ranks test was employed. Table 5 shows the significance level between the adjacently ranked benefits.

The results of the Wilcoxon test show significant differences in the scores assigned to benefit 1 and those assigned to benefits 2 and 3. The test also shows that there is no significant difference between the other two benefits of cost allocation. That is, there are no significant differences in the individual scores assigned to these benefits by respondents. This result confirms the previous conclusion that the hypothesis that allocations are perceived by top management as unlikely to improve the resource allocation process can be rejected. It also confirms that the null hypotheses that allocations are perceived by top management as unlikely to reduce both perquisites consumption and budgetary slack cannot be rejected.

**Table 5**
**The benefits of cost allocation.**

| *Mean rank* | *Benefits of cost allocation ranked from most to least* | *Significant difference between adjacent ranks* Wilcoxon Test *Z value* | *2-tailed P* | *No. of cases* |
|---|---|---|---|---|
| 3.46 | Improve resource allocation | −3.907 | 0.0001 | 69 |
| 2.36 | Reduce expenditure on perquisites | −2.753 | 0.0059 | 68 |
| 1.97 | Reduce budgetary slack | | | |

| *Number of cases* | *Kendall Correlation Coefficient of Concordance (W)* | *Chi-square* | *Significance* |
|---|---|---|---|
| 68 | 0.3191 | 86.7935 | 0.0000 |

## Conclusions and further research

This study has examined the rationale for cost allocation. The purpose was to discover if the decision to allocate costs was influenced by behavioural factors. In addition the claimed benefits of cost allocation were also empirically examined. It is apparent that cost allocations are made by top management to influence the behaviour of managers in a desired manner. There is now a need for empirical evidence for those whose performance is affected by the allocated costs (i.e. the divisional managers themselves). Their views might well differ.[5] Apart from the study of Melrose-Woodman (1974) on a small group of subsidiary managers (20 subsidiaries), no research has been carried out to investigate the perceptions of divisional managers as regards cost allocation for the purposes of performance evaluation. If further research shows that divisional managers are better motivated by systems of cost allocation, it would then be important to find out whether this is because of the validity of allocations or because of other actions taken by top management to motivate subordinated managers. Divisional managers' perceptions regarding cost allocation could also be compared with those of top management to find out the extent to which they conform with each other.

As far as the benefits of cost allocation are concerned it was found that top management perceive allocations as being likely to control costs and encourage the optimal utilisation of resources. Nevertheless, further research is required to examine which cost allocation method/basis is more effective in motivating divisional managers to economise in their usage of central services, and in particular to discover which allocation method is more likely to lead to optimal utilisation of resources within the organisation (See Biddle and Steinberg, 1984; Burritt *et al.*, 1980). There is as yet no explanation as to whether the full cost allocation method encourages optimal utilisation of resources. Nor is there an explanation of whether managers will be motivated better if the charge is less or more than that resulting from the use of the full cost method. A low charge may motivate subordinate managers to use the service to an extent that is not economically justified. According to Zimmerman, this will increase the total cost to the company because of the opportunity cost involved. In contrast, a high charge may restrict the beneficial use of the service. It is also assumed that if the total cost of the service or a lump sum charge is made, regardless of the usage, this may not result in an optimal behaviour. This is because users will view the cost of any additional unit they need as equal to zero. Thus, further research is also required on this issue.

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[5] A more case-oriented description and analysis is given in Ezzamel and Bourn (1986).

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# An Investigation of Some Factors Affecting Taxpayer Non-compliance

**Jean Strader and Christine E. Fogliasso***

**Abstract**—A growing concern in almost every nation today is the amount of 'tax gap' (i.e. the difference between the taxes actually paid and what would be paid if all taxpayers filed complete and accurate returns and paid all the taxes they owe). Because the tax gap is often quite substantial, the problem of taxpayer non-compliance is one that requires careful scrutiny. This article addresses the problem of taxpayer non-compliance in an international context. The article briefly presents three of the main factors said to affect taxpayer non-compliance (rate structure, tax complexity, and control system). Next some estimates of the extent of non-compliance in seven countries (Sweden, Japan, Netherlands, United Kingdom, France, Italy and the United States) are reported and an examination made of the three factors in each country's tax system. It concludes with a discussion of how each factor analysed affects taxpayer compliance.

## Introduction

Is taxpayer non-compliance a major problem in the world today? Many people believe so. However, in the United States, the Internal Revenue Service (IRS) boasts that the US has one of the highest voluntary compliance levels in the world. It estimates that approximately 83% of the total amount of tax that should be reported is actually being reported and paid (Kenadjian 1988). This sounds somewhat encouraging. However, in dollars, the amount of the 'tax gap' in the United States alone has been estimated at $100 billion per year (American Bar Association, 1987). (The tax gap is 'the difference between the taxes actually paid and what would be paid *if all* taxpayers filed complete and accurate returns and paid all the taxes they owe.') This amount could have eliminated half of the 1987 federal budget deficit.

Taxpayer non-compliance should therefore be recognised as a major problem. In the last decade, attention has been given to different factors explaining non-compliance. This article will present three of the main factors said to affect non-compliance. Then some estimates of the extent of non-compliance in seven countries will be reported, and an examination will be made of the three factors in the tax systems in each country.

## Factors affecting non-compliance (review of literature)

Some common themes have emerged in the literature concerning the reasons why people cheat on their taxes. Although there are many theories, the three factors on which this article will focus are the tax rate structure, the system of controls, and tax complexity.

The rate structure explanation states that, as rates becomes higher, there is more incentive to under-report income. Simulations have been made to support this theory, finding that higher tax rates tend to stimulate tax evasion. Clotfelter (1983) found that the elasticity of the marginal tax rate to the amount of under-reported income ranged from 0.515 to 0.844. 'These elasticities imply that a 10% decline in this rate [0.40] to 0.36 would result in an expected 5% to 8% decline in underreporting' (Clotfelter, 1983). 'While the reason for this is not clear, it may be that taxpayers in making tax evasion decisions focus on the potential gains from undetected acts of underreporting which increase with tax rates' (Spicer, 1986). A summary of the literature on the relationship between tax rates and tax compliance includes a number of studies using various methods. Analytical models, analysis of IRS data, behaviour lab studies, and voter and taxpayer polls have been used to confirm that non-compliance increases as tax rates rise (Milliron, 1988). Moreover, a recent survey result revealed that a majority of certified public accountants view a reduction in tax rates to be the most important feature for increasing compliance (Milliron, 1988).

A second factor affecting taxpayer non-compliance is the control system within the tax administration. The control system can be thought of as two subsystems: preventive controls, such as withholding and third-party information returns, and punishment controls, such as IRS audit, civil and criminal sanction. The preventive controls serve to reduce the opportunity for non-compliance. It has been shown that compliance rates are highest for wage income, followed by interest income and dividend income (Clotfelter, 1983). Taxpayers are aware that this information is forwarded to the IRS, and successful evasion is unlikely. The punishment controls deal with the fear of sanctions as a deterrent to tax evasion (Spicer, 1986). Generally, this theory is an economic model, which 'treats non-compliance as a rational individual decision based upon probabilities of detection and conviction and levels of punishment' (Dubin, 1988). Empirical studies supporting this have shown that a decline in audit rates in the 1970s may have accounted for a portion of the decline in compliance during that period (Witte, 1985).

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*The authors are, respectively, an MBA candidate and assistant professor of business law, Pittsburg State University, Pittsburg, Kansas, USA.

The last factor affecting compliance is tax complexity. Although the two factors mentioned previously can explain the amount of wilful non-compliance, they ignore the possibility of the taxpayer making honest mistakes. This last factor does explain accidental non-compliance. 'Accidental non-compliance is caused by the complexity of our tax laws, by the difficulty of keeping accurate records, by inability to obtain the information needed to comply, and the taxpayer negligence and lack of due care' (American Bar Association, 1987). Because of complex laws, mistakes can be made either in favour of the taxpayer (undercompliance) or in favour of the government (overcompliance). Therefore, it is possible that the net effect of complexity on the tax gap could approach zero. Nevertheless, the complexity factor should not be dismissed. Increased complexity means increased cost for a government in educating and assisting the public and in detecting and correcting errors. The complexity factor includes both the complexity of the code itself (what does the law require be reported), and the complexity of required record-keeping and completing returns (how to report it). Complexity can be measured in several ways, such as number of sections in the code, number of deductions allowed, number of schedules in an average return, or number of calculations in an average return. Studies have shown that 'those deductions with the highest levels of compliance are generally the simplest, both in terms of record-keeping and calculations and in terms of the number of other parties involved' (American Bar Association, 1987). Complexity can also be measured by how often the law changes. Pleadings have been made to leave the code as it is 'for a long enough period of time so that everyone can get used to it . . . ' (Portney, 1987).

## Measuring non-compliance

As stated previously, the IRS has estimated that the taxpayer compliance rate in the United States is 83%. Finding similar data for other countries is difficult. One reason for the lack of comparable information is the existence of different definitions of non-compliance. While estimates of non-compliance exist for other nations, it is often unclear exactly what is being included. The IRS only measures non-compliance as that amount deriving from legal-source income. Although income from illegal activities is of course taxable, it is beyond the scope of the IRS to estimate the size of illegal activities (Kenadjian, 1988). Other countries, however, often include illegal-source income in varying degrees in their estimates. Many nations, instead of publishing the amount of non-compliance, estimate the size of the hidden economy. The hidden, or underground, economy generally includes hidden income deriving from both legal and illegal activities. It is important to note that the remainder of this article generally uses estimates of the hidden economy because those are more prevalent on a global basis than estimates of non-compliance.

Furthermore, because the actual definitions differ, the methods used to measure and estimate differ widely. There are basically three methods which can be used to quantify the size of the hidden economy: pure speculation, educated guesses, and well-defined methods (Frey, 1982). The well-defined methods contain at least four different approaches: the national income approach, the tax auditing approach (which is used in only Sweden and the United States), the labour participation approach, and the monetary approach (which usually yields higher estimates) (Frey, 1982). Some of these methods may be used either from a macro-level or a micro-level. Each method can, and often does, produce conflicting estimates. Moreover, estimates seem to be classified as either 'official' or 'unofficial'. Official estimates are generated by a government or by an agency or programme supported by the government, while unofficial estimates are the products of independent economists-researchers. Therefore, an estimate using even a well-defined method may be clouded by the degree of objectivity of the source of the estimate. Although this paper will attempt to use estimates resulting from the well-defined methods, the method and source used in each country is not entirely clear. Therefore, the estimates are not comparable among, or even within, nations. In spite of the diversity of methods and estimates, a survey of available estimates may be useful in order to understand the perceived size of the hidden economy in each nation. Since there is a lack of comparable data, it has also been suggested that 'it is more sophisticated to identify the factors which cause the rise and existence of the hidden economy' (Frey, 1982). The remainder of this paper will therefore examine the reported extent of non-compliance in seven countries, and the three key factors of rate structure, control system, and tax complexity within each country.

## Sweden

*Extent of Non-compliance*

Although only a few estimates have been made for Sweden, one estimate placed the size of the hidden economy from 3.8% to 6.4% of GNP for the years 1970 to 1979 (Andersson, 1987). This estimate does not include 'drugs, theft, prostitution, etc'. A separate estimate made by the Swedish police placed the amount of 'tax cheating' at 1.4% to 5.4% of GNP for 1977 (Andersson, 1987). Monetary methods of estimation (which generally yield high figures) resulted in measurements of 3% to 20% of GNP in 1982 (Andersson, 1987), and 6.9% to 17.2% for 1978 (Frey, 1982). A national income method of estimation placed the size at 4.7% for 1978 (Frey, 1982). As a result of these estimates, it has been judged that Sweden has a small hidden economy. 'More generally, the traditional relatively high degree of social coherence, relatively efficient bookkeeping, and relatively limited corruption among government officials in Sweden tend to restrict the size of the underground economy' (Hansson, 1982).

*Rate Structure*

The rate structure for Sweden contains the highest tax burden in the world. Individual rates range from 34% to 80%, and the corporate rate is 52%. The high rates are thought to be the main cause of the existing sector of underground economy in Sweden (Hansson, 1982).

*Control System*

Sweden relies heavily on information reporting. Employers must provide information on salaries paid, the stock exchange provides information on dividends and holdings, and banks provide information on interest paid. The withholding system also makes it difficult to underpay taxes. The employee must show the employer a tax card at the beginning of the year proving that no old taxes remain payable. If any do remain, the employer must withhold it (Andersson, 1987).

Every tax return in Sweden is audited by an inspector. The inspector can turn over a suspicious return to the tax board for investigation. Since the tax board is a local agency (there are at least ten tax boards in a small town with a population of 20,000), the members usually know the taxpayers individually, thus making it difficult to hide income or claim excessive deductions. If cheating on taxes is discovered, the fee is 20% of the neglected tax. However, if the tax authorities do not have access to information about the taxpayer from a source other than himself or herself, the fee is 50%. A taxpayer can also be sued in court, and for major crimes can be imprisoned for up to six years (Andersson, 1987).

*Complexity*

In recent years there have been reforms made to simplify the tax system. However, 'it has become very difficult for the ordinary citizen to calculate his own taxes' (Andersson, 1987).

## Netherlands

*Extent of Non-compliance*

Macroeconomic estimates of the hidden economy in the Netherlands range from 5% to 10% of GNP (De Kam, 1987). The hidden economy is defined as including unreported income from both legal and illegal sources. Microeconomic estimates have placed the size of the hidden economy at slightly over 6% of GNP (De Kam, 1987). In addition, one study reported in 1975 that 'as much as 40 to 50% of total interest received by individuals on savings deposits and bank accunts was not reported to the tax authorities' (De Kam, 1987).

*Rate Structure*

The rate for individuals ranges from 16% to 72%, 'but numerous tax preferences reduce effective rates' (De Kam, 1987). The corporate rate is 43%.

*Control System*

Taxes are withheld from wages and dividends. Other taxes are based on assessment. The tax inspector issues a tax return to a person he or she feels is liable for tax. The taxpayer is obliged to file it; also, any qualifying taxpayer who is not issued a return is obliged to request one. The tax officer will examine the return and issue an assessment.

It is felt that both the tax administration and law enforcement agencies lack sufficient qualified personnel to fight tax fraud. However, efforts have been intensified in the last few years. Data processing has increased along with the issuance of a 'tax number'. However, 'many taxpayers feel uneasy about their privacy, which may be endangered by a free and automated exchange of information' between government and banks (De Kam, 1987).

*Complexity*

The tax system contains a large number of complex deductions. 'It is primarily this jungle of deductions and tax preferences which makes the tax system so complicated and incomprehensible to the ordinary taxpayer and gives him the feeling that others pay less than they would under a tax with fewer loopholes' (De Kam, 1987).

## United Kingdom

*Extent of Non-compliance*

The Inland Revenue estimated that 1977 income not declared for tax purposes might amount to

7.5% of GDP (Macafee, 1982). A national income method of estimation placed the size of the hidden economy at 2.5% to 3.0% of GNP in 1978 (Frey, 1982). Other national income measurements placed the estimates during the 1970s from 1.0% to 2.9% (Frey, 1982). Because of problems of using the national income method in the United Kingdom, it has been concluded that 5% of GNP is a lower boundary for the hidden sector of the United Kingdom in 1978 (Frey, 1982). Higher figures are obtained with the monetary method: 15% and 33% in two separate studies (Morris, 1987). A pilot compliance study done in 1981 by the Inland Revenue predicted that 20% of their sample had probably understated income (Morris, 1987).

### *Rate Structure*

The individual rate structure was progressive with six levels beginning at 25% and at one time rising steeply to 60%. In 1989 there were only two rates: 25% and 40%. The corporate rates were 30% for small companies and 50% for large companies (Morris, 1987). In 1989 these rates are 25% and 35%.

### *Control System*

Taxes are withheld on earned income by employers. Individuals complete a tax return only if requested by the Inland Revenue, or if it is to their benefit. 'In practice, only a minority of taxpayers receive tax returns, with tax inspectors selecting those with abnormal circumstances, or whose details they expect to have changed, on a rather ad hoc basis' (Morris, 1987). Because of the withholding system, it is difficult for an employee to underpay on his primary earnings. 'However, evasion on secondary earnings is much more common... there is a general ethos that secondary earnings are somehow less subject to tax than primary earnings' (Morris, 1987).

One control problem in Great Britain stems from self-employed craftsmen and artisans, who insist on being paid in cash. Plumbers, carpenters and painters routinely quote a higher price if the service is to be paid by cheque rather than by cash (Pechman, 1986).

Britain's detection system does not seem to be very tight. There is no government audit of companies' financial statements, and the Revenue will normally accept the financial statements without asking many questions. However, some companies' tax computations are selected for scrutiny (Touche Ross, 1978). Moreover, 'although the revenue departments chase large evaders quite vigorously, their scrutiny of ordinary individuals' behavior is patchy' (Morris, 1987). In the period from 1980 to 1984, only 344 convictions for evasion were made each year.

### *Complexity*

Those individuals having to file under schedules for income from trades, professions, and self-employment have a complicated task. The taxpayer is required 'to supply records and background documentation showing all expenses incurred and income earned' (Morris, 1987). Likewise, a corporation can submit its financial statements and supporting computations in lieu of submitting a formal return (Touche Ross, 1978). Due to complexities in the law, it is perhaps a relief to the taxpayer that few formal returns have to be completed and filled. For example, it is often necessary for the Revenue to examine two years' data before making a decision on tax liability for any one year. This is because tax on income from other sources is assessed on the preceding tax year's receipts. For example, earned income is taxed in the year received, while interest income is taxed in the year after it is received (Touche Ross, 1978).

## Italy

### *Extent of Non-compliance*

Italy is thought to have one of the highest non-compliance rates in the world. Estimates using a monetary method have been made that the size of the underground economy in 1978 was around 30% (Del Boca, 1982). More conservative estimates place the figure between 17% and 20%, using a labour participation method (Contini, 1982). Pure speculation places the size of the hidden economy at 30% to 40% of GNP (Frey, 1982). For 1978, a labour participation method produced results of 22%, a monetary method produced a size of 30.1%, and 'other' methods produced results of 11.4% (Castellucci, 1978). Because of economic conditions in the mid-1960s, Italy began a rapid trend toward decentralisation of production and a movement toward small-scale businesses, artisans, and work done in the home. This segment has been referred to as Italy's irregular labour, which, by its nature, is outside the system, and 'precarious, unprotected, and beyond any form of organized social control' (Contini, 1982).

### *Rate Structure*

The individual rates for 1986 ranged from 12% to 62%, with nine levels. The corporate rate has been 36% since 1984 (Castelluci, 1987).

### *Control System*

Taxes are collected on wages and salaries through withholding. If a taxpayer has no other income, the tax liability is completely settled, and there is no need to file a return. However, Italy's major control problem is with taxpayers who are outside the withholding system. 'It is quite common, especially in the small business sector, to underreport revenues by simply not issuing invoices. Very often home repairs, as well as services of physicians, lawyers, and the like, are paid by the client in cash, without a regular invoice' (Castellucci, 1987).

### *Complexity*

The system is still quite complicated and under continuous revision. 'Considerable expertise is required on the part of taxpayers and experts alike in order to understand the system' (Castellucci, 1987). Unless the taxpayer has only income from one job, he or she must file a tax return in which that taxpayer computes the amount of the tax liability. 'Self-assessment of one's income tax is indeed a difficult task for many taxpayers, particularly those who are less educated or live in less developed areas' (Castellucci, 1987).

## Japan

### *Extent of Non-compliance*

An estimate made in 1980 of the size of the underground economy in Japan placed it at 1% of GNP (Frey, 1982). In Japan, it has been found that different classes of taxpayers display different degrees of compliance, and therefore most studies in Japan have focused on this. A national income method of estimation has stated that 'the reporting rates in 1970–78 were only 60–70% for business income and 20–30% for agricultural income, as compared with 90–100% for wages and salaries (Homma, 1987). The degree of reporting is said to be represented by '10-7-5', 'This means that the tax authority can 'grasp' 100% of wage and salary income, 70% of business income, and only 50% of farm income' (Homma, 1987).

### *Rate Structure*

For the year 1986, individual tax rates ranged from 10.5% to 70%, with 15 brackets. The corporate rate was 43.3% on undistributed profits and 33.3% on distributed profits, with slight reductions for small companies (Homma, 1987). However, 'the most significant feature of the Japanese tax system is the relatively light load that it imposes on the taxpayer' (Pechman, 1986). The tax burden is light because of allowances of generous deductions and exemptions which are relatively high by US standards.

### *Control System*

Japan uses a withholding system on employment income, as well as on interest and dividend income. Because of this, the mass of wage and salary workers are not required to file a return, but may do so if beneficial. If a taxpayer does file a return, and it is found to be incorrect, the tax authorities will assess deficiencies.

One interesting feature of the control system is the public publishing of names of individual and corporations which file returns reporting high income or large inheritances. Lists of these names are publicly posted and published in the press. This practice is thought to help promote voluntarily compliance among the wealthy. In fact, some taxpayers purposely inflate their income so that their names will appear on the lists (Pechman, 1986).

The use of anonymous and fictitious bank accounts is allowed in Japan, and represents a major control problem. Businesses and individuals can use a seal instead of their name to open bank accounts and make withdrawals. These accounts are taxed at a flat rate of 35%, which makes them profitable for those in higher income brackets (Homma, 1987). A sample study done in 1968 revealed that 36% of total deposits were held in anonymous accounts, 31% in fictitious accounts, and only 33% were in accounts with full and correct identification (Pechman, 1986).

### *Complexity*

Taxation in Japan is viewed as an instrument of economic policy, and there is an attempt to satisfy many special-interest groups. 'Some part of the tax system is modified each year, often to a significant extent.' The result is 'a bewildering variety of tax preferences that makes the US tax system look like a model of tax neutrality' (Pechman, 1986).

## France

### *Extent of Non-compliance*

Most official studies in France have concentrated on measuring evasion by source of income and by profession (Lienard, 1987). Although 'no offical estimates are available of the overall size of tax evasion or of the hidden economy, unofficial estimates have placed the size of the hidden economy at 6%–8%' (Lienard, 1987). An earlier estimate using a national income method placed the size of the hidden economy at 23% of GNP for 1965 (Frey, 1982).

### *Rate Structure*

Individual tax rates for 1986 were from 0% to 65% ranging over 14 brackets. The corporate rate is 45% for reinvested profits, and 50% otherwise (Lienard, 1987).

### *Control System*

France is one of the few countries in the world which does not collect the personal income tax currently through withholding. However, about 30% of the taxpayers voluntarily use the option of paying their taxes on a monthly basis by automatic deductions from their bank accounts. Taxpayers must file returns, which are reviewed.

For late filing or late payments, a 10% penalty is levied. 'Penalties for understated income range from 25% (unintentional errors) to 150% (fraud). Individual taxpayers are seldom audited. However, an inspector may make reference to exterior signs of wealth (possessions) for contesting a return or requesting more information' (Lienard, 1987).

### *Complexity*

An overall view of the French tax system criticises it for being 'extremely complex and difficult for the taxpayer to understand, and so he perceives the system to be unjust' (Lienard, 1987). Tax management centres have been established by the government to aid small businesses and professions in keeping their accounts and improving compliance.

## United States

### *Extent of Non-compliance*

Although the IRS does not generally estimate the size of the hidden economy, that agency has used figures supplied by the General Accounting Office to estimate the amount of unreported income for 1976 for a combination of legal and illegal sources. The findings were between 5.9% and 7.9% of GNP (Frey and Pommerehne, 1982). A survey of various other methods employed during the 1970s yielded higher estimates of 8.1%-11.7%, 13%-14%, 22%, 28% and 33% of GNP for the size of the hidden economy (Frey and Pommerehne, 1982).

### *Rate Structure*

Tax rates have been declining since the end of World War II, except for the periods of funding the Korean War and the Vietnam War. During the 1970s, the individual tax rates ranged from 14% to 70%. In 1984, these were reduced to 11% to 50% (Pechman, 1986). Rates continued to decline, with the current rates being 15% and 28% (Fox, 1988). The rate structure has also become less progressive over the last two decades (Pechman, 1986). The trend towards a flatter structure was continued in the Tax Reform Act of 1986, when Congress reduced the number of brackets from fifteen in 1986 down to five in 1987 and two in 1988 (Fox, 1988). Corporate rates in the 1970s ranged from 20% to 26%, in the first half of the 1980s ranged from 15% to 46%, then in 1987 ranged from 15% to 34% (Commerce Clearing House 1976, 1982, 1985, 1986, 1987). Large corporations also pay a surtax in addition to the regular tax. The surtax is 5% of taxable income over $100,000, not to exceed $11,750 (Whittenburg, 1988).

### *Control System*

The US relies heavily on information reporting. Most wage income, interest and dividend income, and pensions and annuities are covered by information reporting. The voluntary reporting percentages on these sources of income are high. For the tax year, the voluntary reporting percentage for wages and salaries was 99.5%, for interest and dividends was 94.6%, and for pensions and annuities was 98.4%. The lowest reporting percentages was 13.1% from 'informal suppliers'. These are defined as 'proprietors who operate with informal business styles' (Committee on Ways and Means, 1988).

In addition to information reporting, the US also uses an audit system. A computer statistical sampling technique, called the Discriminant Function System, is used to select most tax returns for audit. Also, a random selection process, the Taxpayer Compliance Measurement Program, is used to select a small number of returns for examination (Whittenburg and Whittington, 1988). Audits are either conducted by correspondence, in the office of the IRS, or at the location of the taxpayer. An audit programme aimed at corporations is the Coordinated Examination Program, which focuses on the largest and most complex corporate taxpayers (Committee on Ways and Means, 1988). There are about 1,450 corporations in this programme, and the IRS feels 'in terms of returns for investment, it is our best producing program' (Committee on Ways and Means, 1988).

The control system also includes an enforcement system, whereby interest and penalties are charged on underpayments. Besides civil penalties, criminal penalties can be assessed for fraud. 'Privacy statutes mandate that most tax enforcement actions remain confidential, so that only the small number of criminal tax evasion cases are routinely publicized' (American Bar Association, 1988). The lack of public knowledge of tax offenders may contribute to the lack of social stigma against non-compliance.

### *Complexity*

The tax system in the US is perceived by the taxpayer to be highly complex, and in fact is. Many people, even those at low or middle income levels, feel they must seek professional help every year. One basic reason for this complexity is the fact the tax system is used to promote those economic and social objectives deemed desirable by politicians rather than equity and economic efficiency objectives (Pechman, 1986). As each special deduction or credit is added to the Internal Revenue Code, it becomes longer, more unreadable, and more burdensome for the taxpayer wishing to comply. Clerical errors alone in 1981 comprised $500,000,000 of the individual income tax gap (American Bar Association, 1987). The tax law has been changed 19 times in 23 years (Committee on Ways and Means, 1988). The latest tax law, the Tax Reform Act of 1986 (also called the 'tax simplification act')

**Table 1**
**Comparison of Factors Affecting Non-compliance**

| Nation | Severity of Non-compliance | Rate Structure + | Tax Complexity + | Control System − |
|---|---|---|---|---|
| Sweden | Low | High | Medium | High |
| Japan | Low | Medium | High | Medium |
| Netherlands | Medium | Medium | Medium | Medium |
| United Kingdom | Medium | Medium | High | Low |
| France | Medium | Medium | High | Medium |
| Italy | High | Medium | High | Low |
| United States | Medium | Medium | High | High |

resulted in 2,704 changes in the code, 42 new regulations, 65 announcements, 32 revenue rulings, and 48 new tax forms (Committee on Ways and Means, 1988). Not only do the taxpayer and tax practitioner have a difficult time keeping up with the changes, but the IRS itself also struggles to keep current. In a recent survey by the General Accounting Office, it was determined that the IRS 'is giving incorrect answers to 39% of the questions posed by people who call for help with their tax returns' (Committee on Ways and Means, 1988).

## Conclusion

The above findings are summarised in Table 1. Each nation has been rated in size of non-compliance and in the three factors affecting non-compliance. The second column contains a rating of the extent of non-compliance, and was done by taking the average of the reported range estimates of the hidden economy for each country. The next column contains the rating of the tax rates, and was done simply by comparing the rate structures of the nations. The last two columns are based on a subjective evaluation of the information found on control systems and complexity. The plus and minus labels have been placed above the columns to signify the type of correlation that is conventionally thought to exist between each factor and the size of non-compliance.

Upon examination of the table, it is observed that factors do not always affect the size of non-compliance in the conventional, expected way. For example, Sweden has low non-compliance, but has high rates. This is contrary to what would be expected if one believes the theory that high rates encourage tax evasion. Complexity is generally thought to encourage non-compliance. However, this is not the case with Japan, which displays high complexity and low non-compliance.

The control system stands out as perhaps having the greatest effect on non-compliance. Conventional concepts state that tight controls will have a deterrent effect on non-compliance. This is seen in both Sweden and Italy. Sweden has a low non-compliance rate and a tight control system, while Italy has a high non-compliance rate and a loose control system.

In conclusion, although a tightening of control systems does seem to have a positive deterrence on taxpayer non-compliance, it is not the intention of this article to suggest that all a nation has to do to curb evasion is to tighten controls. The amount of compliance or non-compliance in a nation does not depend on isolated factors, but depends on a complex mix of conditions. A fourth important factor affecting non-compliance which this article did not attempt to address is moral attitude. This factor is difficult to measure, but it very well could be the main determinant of non-compliance. Quite possibly, a high public spirit embracing compliant behaviour as the ideal could make a study such as this one unnecessary.

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Book Reviews

# Global Surveys of Corporate Disclosure Practices and Audit Firms: A Review Essay

## T. E. Cooke and R. S. O. Wallace

**International Accounting and Auditing Trends.** *Vinod B. Bavishi.* Center for International Financial Analysis & Research, 1989. 2 vols, 1,392 pp. US$ 295.

**World Survey of Published Accounts: An Analysis of 200 Annual Reports from the World's Leading Companies.** *D. J. Tonkin.* Lafferty Publications, 1989, 524 pp. £340.

These two books complement one another interestingly as contributions to the cross-national study of corporate reporting practices and the market for auditing services. The first book (*International Trends* henceforth) by Vinod B. Bavishi is a culmination of the task he began in 1984 when the Center for International Financial Analysis and Research (CIFAR) was founded to facilitate the better understanding of international financial statements and to study global trends in international accounting and auditing. This book essentially updates and improves on the surveys by Price Waterhouse (1979), Bavishi and Wyman (1983) and Gray, Campbell and Sweeney (1984). It is a database on accounting and disclosure practices of industrial, banking and insurance companies from 24 countries and the market for auditing services. The book does not seek to rank companies or countries as does the second book but provides a rich database from which such comparisons can be made. The second book (*World Survey* henceforth) by David J. Tonkin is a survey of reporting practices by 200 of the world's leading companies in the year 1987 and a comparison of the quality of their disclosure.

'A perfect judge' wrote Alexander Pope, 'will judge each work of wit with the same spirit that its author writ'. This review essay seeks to assess each book against the goals it sets itself, the validity of such goals, their operationalisation and the external validity of the results. The essay draws attention to the successes and failures of each book in the hope of pointing the attention of future authors to possibilities for improvements. In addition, a summary of the main findings of each book is provided.

The authors of these books possess impeccable records for undertaking their tasks. Both are academic and professional accountants. They both have vast experience in the generation of databases of financial reporting practices and the analysis of corporate annual reports for the purpose of identifying trends and developments in corporate reporting. Tonkin has been a joint editor of the annual survey of published UK accounts produced by the Institute of Chartered Accountants in England and Wales since 1983, and Bavishi is a co-author of *Who Audits The World* and founder of CIFAR.

Section 1 of volume 1 of *International Trends* deals with corporate reporting (chapters 2–7) and section 2 deals with the market for auditing services (chapters 9–14). The volume is essentially a descriptive report of the results of an extensive survey. Data relating to current practices in 24 countries are provided on (a) alternative accounting methods (described as 'standard'), in respect of 36 valuation and measurement items adopted by industrial companies (chapter 2); and (b) alternative disclosure methods in respect of 78 information items (chapter 3). Information on 16 and 25 disclosure items in the financial statements of banks and insurance companies respectively is provided in chapter 4. Analysis of similarities and differences in 38 disclosure items in interim financial statements of industrial companies in 20 countries is provided in chapter 5. Administrative and procedural problems of preparing and using annual reports of transnational corporations are presented and analysed in chapter 6 which also suggests some practical approaches to the analysis of companies across national boundaries (pp. 24–28). Chapter 7 presents the major findings and implications for the future.

In chapter 9, an analysis of the leading 16 international accounting firms based on their offices and number of partners worldwide is presented. The global client base of these firms is analysed in chapter 10. Factors which determine audit fees reported in the annual reports of client companies in nine countries are discussed in chapter 11. The differences in auditors' reports and promptness in completing the external audit in 24 countries are taken up in chapter 12. Chapters 13 and 14 deal with the problems of evaluating the competitive strengths and weaknesses of an international accounting firm in the global market. The topics covered include personnel statistics including recruitment, training and quality control; generation of revenues, changes in clientele, marketing practices and publications; opportunities and threats in the external environment via an examination of industry characteristics, potential strategies for expansion and the possible threats of additional competitive forces. Chapter 14 identifies three potential opportunities for growth of international accounting firms: the movement toward a unified European market in 1992; the globalisation of capital markets; and increased interest in emerging capital markets in many Third World countries. Three potential threats are also identified: legal liabilities for professional negligence; technological change and its impact on audit fees; and mergers and acquisitions within the client base.

Of particular significance and help to the preparer of annual reports are Appendices A, B and C which offer guidance for the preparation of the annual report of a multinational industrial company, commercial bank and insurance company respectively. These are useful frameworks for future cross-national comparative analysis of corporate annual reports.

Finally, there is a glossary of accounting terms with translation from Dutch, French, German, Italian, Japanese, Korean, Portuguese and Spanish to English and vice versa in Appendix D. It is promised that the next edition of *International Accounting and Auditing Trends* will be published in October 1990 and the author invites comments and suggestions for improvement of future editions from users of the present edition.

Volume 2, essentially a revised edition of *Who Audits The World: Trends in the Worldwide Accounting Profession* by Bavishi and Wyman (1983), is in four parts. It presents country-by-country data relating to 16 international accounting firms on (i) the number of partners, (ii) list of client companies, (iii) audit fees and (iv) summary profiles on number of offices, partners and percentage of partners worldwide. The number of countries covered is 48 in Africa, 30 in Asia/Pacific, 26 in Europe, 3 in North America and 40 in South America/Caribbean.

The compilers of the data reported in the two volumes have taken great care to prevent many of the inadequacies and pitfalls which featured in previous databases (Nobes 1981), and a careful audit of the contents of this book did not reveal any significant biases and errors.

Some major findings of *International Trends* are contrasted with some of the major conclusions of *World Survey* below, but the following major findings require especial mention:

1. Not all subsidiaries of which an industrial parent company owns 50 percent or more are consistently consolidated, thus giving an incomplete picture of performance. Furthermore, different methods of accounting for long-term investments make net income difficult to compare.
2. Financial reporting practices vary more than valuation, measurement and recognition methods among banks and insurance companies worldwide. The reverse is true for industrial companies. This is consistent with an earlier finding by Nair and Frank (1980) that measurement practices vary more than disclosure practices across the world.
3. Canadian, Japanese and US companies generally provide more information in interim reports than companies from the rest of the world.
4. The big eight accounting firms dominate the accounting services industry and KPMG (a 1987 merger of PMM and KMG) led all other big eight firms in total number of offices, partners, clients audited and sales and assets of clients audited. This lead is now open to question because of the creation of Ernst and Young by the merger of Ernst and Whinney and Arthur Young.
5. North America is the largest region for the auditing industry.
6. The format and content of auditors' reports vary considerably worldwide. Specifically, key conclusion words and indication of auditing standards used lack uniformity.

*World Survey* possesses three extremely attractive features: simple language, a good structure to a complex subject, and profuse illustrations. It is a comparative analysis of corporate reporting practices by 200 of the largest companies in the world and it contains a discussion of the objectives, pronouncements and future directions of the International Accounting Standards Committee (IASC), the United Nations Centre on Transnational Corporations (UNCTNC) and the Organisation for Economic Cooperation and Development (OECD). However, the scholarly and argumentative tone of books on comparative corporate reporting has been forsaken here in favour of the presentation of available reporting options and examples selected from some of the companies in the sample. The result, facilitated by clarity of organisation and writing, is that the descriptive/empirical study of 200 companies selected from across the world is elevated to a position of greater importance than the authors' opinions on these subjects. But before the substantive review of the book, it is necessary to refer to some general flaws.

First and probably most important is the price. At £340, *World Survey* will not be found on the shelf of many academics. It is condemned permanently to the library shelves of a few rich universities and professional associations. Compared with *International Trends* with 1,392 pages of very informative data potentially useful for future research and which retails at US $295, *World Survey* is a very expensive book. Second, footnote and academic explanations of empirical findings are sparse. Third, like *International Trends*, there is neither bibliographical reference nor an index, in a book whose size would make the task of an executive in search of corporate disclosure examples daunting. The last two points are objectionable not only because they portray either poor or sloppy scholarship or both but also because as such, *World Survey* is a bad example for university and research students who will make the bulk of its readership from academe.

Another flaw in *World Survey* relates to the authorship. Contrary to the specification on the dust cover, this book is written by four main persons and edited by one of them, who has been credited with the authorship. The following is how the entire book was credited to each of the main authors:

| *Author* | *Text* | *No. of pages* | *%age of textual pages* |
|---|---|---|---|
| D. J. Tonkin | Introduction and Scoring Procedure | 65 | 13 |
| B. Koch | Financial Statements | 100 | 20 |
| J. Laidler | Accounting Policies, Auditing and Auditors | 170 | 34 |
| C. Roberts | Non-Financial Statement Information | 149 | 30 |
| Others | The IASC, the UN and the OECD | 15 | 3 |
| Textual Pages | | 499 | 100 |
| Appendixes | | 13 | |
| Blank pages—separating chapters | | 12 | |
| Total Pagination | | 524 | |

This raises a moot point about the criteria for crediting one of many writers of the contents of a book with the sole authorship. If future editions of this book will follow this format, it is advisable that the dust cover should indicate that the coordinating author is the editor rather than the author of the entire book.

*World Survey's* goals are stated as (a) to examine the reporting practices used by 200 of the world's largest companies in preparing their annual reports for publication in the international capital markets, (b) to measure each of the company's performance in terms of its rate of adoption of informative practices and to rank both companies and countries in terms of the measure, and (c) to generate a sequel to the 1980 survey[1] so as to reconsider some of the issues addressed by that earlier survey in the light of the changed circumstances of today, and to make recommendations for improvements.

To operationalise these goals two procedures are used. The first is an index of disclosure methodology by which the companies and countries in the sample are ranked. The second is a survey of the state of financial reporting internationally without making inferences about the quality of disclosure in a quantitative manner. This descriptive survey involves (a) the presentation of statistics of how many in the sample follow one alternative measurement, valuation or disclosure technique or another, and (b) the provision of illustrations of various reporting styles considered to be exemplars of good or bad presentation. Whilst the dominant focus of this survey is said to be operators in the international capital market, the market for the book is '. . . the users and producers of actual reports'. This has implications for (a) the selection of companies in the sample, (b) the items of information selected, and (c) the scoring method used.

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[1] This book does not refer to the *Survey of Accounts and Accountants 1983–84* by Cairns, Lafferty and Mantle published by Lafferty Publications in 1984. This publication reported on a worldwide survey of 250 major companies.

## Selection of companies

The multinationality of a company can arise from the fact that its production, marketing, borrowing or equity financing is transnational. It is only in the case of the last two (loan and equity funding) that operators in the international capital market can be described as the dominant user group. While *World Survey* describes neither operators in the international capital market nor potential users of annual reports of sample companies, *International Trends* identifies such users as (i) controllers and financial executives of corporations worldwide, (ii) students and researchers studying international accounting trends, (iii) stock exchanges and other organisations responsible for setting accounting requirements, (iv) money managers investing in companies worldwide, (v) lending officers of commercial banks worldwide and (vi) partners and managers of international accounting firms. It is, therefore, important for the shares and bonds of selected companies to be traded on the stock exchanges of many countries. The companies in the sample must be aware that they are addressing their corporate annual reports and accounts to the operators in the international capital markets. For example, the London International Stock Exchange (ISE) listing requirements state that financial statements, including the audit report of US companies listed on the New York or American Stock Exchanges which conform to auditing practice in the US satisfy the accounting and audit requirements of the ISE provided such companies observe the requirements of the US exchanges combined with those of the US Securities and Exchange Commission (SEC). Similarly, the SEC permits foreign issuers, with certain exceptions, to prepare their financial statements in accordance with accounting principles which are generally accepted in their home countries, provided that a reconciliation to US GAAP and Regulation S-X is furnished. Many of the companies in the sample are quoted on only one stock exchange: the one located near their headquarters. No information is given to convince the reader that the shareholders are spread over many countries. *World Survey* ignores the many difficulties which users face in analysing international financial statements but these are discussed in Chapter 6, Volume 1 of *International Trends*. Such difficulties include differences in the format of accounts, difficulties in obtaining information on international companies, language constraints, different or multiple currency frameworks and difficulties in combining accounting information with additional information from capital markets in order to assess a foreign company's performance.

There are a host of problems with the basis of selection. The 200 companies in *World Survey* were chosen on the basis of the 1980 survey and only in the cases of bankruptcy or mergers were bigger companies substituted. Apart from the fact that the dominant focus of this survey is different from the 1980s, the composition of the top 200 companies and knowledge of comparative methods have changed tremendously since 1980. The 200 companies came from three 'groups' loosely formed on a 'sphere of influence' basis. Five are allocated to the North American group which includes, for some reason, New Zealand, Australia and South Africa. Three are from the European group and 10 from the 'Rest of the World' group.

The number of companies from each country is unequal: one each from eight countries (Finland, Israel, Luxembourg, Norway, Papua New Guinea, Singapore, South Korea and Zambia), two each from four countries (Denmark, Malaysia, New Zealand and Taiwan), three from India, four from Hong Kong, five from Spain, six from Sweden, nine from Belgium, 10 each from four countries (Italy, the Netherlands, South Africa and Switzerland), 13 from Australia, 15 each from Canada, France, Germany and the UK, 19 from Japan and 25 from the USA. There is no explanation as to the reasons for differences in the number of companies selected per country—some justification should have been provided. Apart from this inconsistency, there is also the problem of whether the reporting style of one (or even 15 companies) can be taken as representative of all listed companies in a country. It seems most likely, as Cooke (1989a) found in his survey of Swedish corporate annual reports, that disclosure by companies listed only on domestic stock exchanges will be significantly lower than that for companies listed on both domestic and foreign stock exchanges. Explanations of the choice of the countries and the types of companies were neither given in this survey nor in the 1980 survey. Although an index of disclosure is useful for comparing corporate reporting practices between countries, industries and years, several questions raised by Bavishi (1981, p. 119) remained unanswered in this book:

> Do international users have the same needs for information as do US [or UK] investors? Would disclosure items of interest change over time? Is different information needed from foreign compared to domestic companies?
>
> How should actual disclosure practices be scored? Should disclosure items be weighted equally or ranked on a scale from say 1 to 5?
>
> Can a subjective evaluation of non-financial disclosures be reflected in such an index? If so, how?
>
> Is there a method of assuring against penalising a company for not disclosing items which are simply not applicable to it?

## Scoring methodology

Financial disclosure is an abstract concept that cannot be measured directly. It does not possess inherent characteristics by which one can determine its intensity or quality like the capacity of a car (Wallace, 1987, p. 431). It is, therefore, essential, whatever scale one adopts to quantify disclosure, to provide evidence that the measures are valid and reliable by specifying the scoring procedure. The operational procedure by which numerals, weights or other symbols are assigned to empirical properties (items of disclosure) are not specified.

There is at present no theory of financial reporting for the 'international captial market operator'; it is, therefore, difficult to assess the relevance, to the users, of the information items evaluated. Unless one is aware of the needs of such a user, it would be difficult to measure the quality of information found in the annual report of any company. Cross-national studies are fraught with problems because of the underlying diversities in the economic, social and political systems of the world. Accounting reports respond to and are informed by changes in the environment of the reporting company. Some of the changes originate from within a country, others come from outside. Any cross-national study of the quality of disclosure in corporate annual reports and accounts can only be truly meaningful if there is an internationally agreed perception of the order of importance of disclosure items, and if the companies and/or countries under study are, in broad terms, similar (i.e., comparable). It is recognised that to obtain such an internationally agreed perception of disclosure items is extremely difficult. It should also be noted that any scaling method for assigning weights to individual disclosure items has the potential to mislead. This is because the level of importance which is attributable to a disclosure item varies according to the entities, transactions/events, the user, company, industry, country and the time of the study.

Three main characteristics of disclosure are evaluated and reported in *World Survey* on the basis of the following weights:

| | *points* |
|---|---|
| Disclosure in financial statements | 65 |
| Disclosure in non-financial statements | 25 |
| Timeliness of the release of annual accounts | 10 |
| | 100 |

Generally, the score awarded to a company is one point for each of the 75 separate reporting issues covered. Some of these issues were given more weight than the others and 'companies with clear evidence of some types of entities, events or transactions, but which make no disclosure in respect of them, score negative points equal to the maximum possible points for full disclosure'. Few items were given weights of five ponts; two of these are (i) the presence of consolidated accounts but not in the German style of domestic consolidations and (ii) segmental information. Companies can score up to six points for disclosing clear statements of accounting policies, each policy statement scoring one point. The underlying criterion for scoring each annual report studied was 'informativeness' by which a company which gives a user more information on a particular disclosure item than another company is awarded a higher score than the other. Although this is a valid criterion if a small number of companies is involved it is not operationally feasible when one is considering many companies. With 200 companies in the sample, the goal of giving credit to informativeness of disclosure of a particular item needs to be disciplined by a scoring scheme. Such a scoring scheme is not described and one can only assume that scores are awarded subjectively.

The author(s) of *World Survey* make(s) us believe that the disclosure items are accorded different levels of importance by operators in the international capital market on the basis of a developed hierarchy of weights. Such weights were neither elicited from a study of the perceptions of such users nor determined from a study of the decision models of such users. They were also not replicated from the 1980 study.

## Disclosure items

On the items of information, it is argued in *World Survey* that the use of an *ex ante* standard in the sense of a set of published standards such as the set of IASs which 'is a distillation of practice which has been observed previous to the study' (p. 5) is inappropriate. The approach taken 'is to review practice, generate a catalogue of practice-based precedents, identify the variability and compare the results with an implied standard of practice which is that observed by the 1980 World Survey'. The standard elicited is a 'distillation of today's actual practice of all [the] sample companies, in the sense that the best companies always exceed any published standards and so set their own *de facto* standards'. This method apparently ignores users' needs but emphasises the interests of reporting companies. This is probably based on the assumption that preparers respond to the needs of the 'international users' of corporate reports. Each disclosure item is evaluated on the basis of what the main author considers is the best presentation. In the circumstances each company is judged by the 'best' disclosure practices of the companies in the sample. The problem with this orientation of scoring is that companies usually decide the depth of disclosure on the basis of many criteria. Although relevance, understandability and informativeness of disclosure may dominate, costs and benefits of such disclosure are not the least important and management has no means of determining the usefulness of disclosure items to a potential 'international user' of its accounts. So this method of scoring is more likely to capture informativeness from the viewpoint of reporting companies than from the viewpoint of the international user.

## Survey of corporate preferences for factors influencing disclosure

*World Survey* reports the results of a 31.5 percent response to a questionnaire on company preferences for, and the influences of, different sources of corporate disclosure regulations and users on corporate disclosure. Six main questions are asked (the questionnaire is reproduced as Appendix 2 in the book) but only responses to the three questions which generated usable responses are reported. The three questions and answers are as follows:

1. Who should make decisions about the financial reporting practices used in the corporate annual report?: the reporting company and nobody else; the law and nobody else; the auditors' professional body and nobody else; the tax authorities and nobody else; any combination of the above (respondents were asked to name them); and any other. The results indicate a preference for a combination of the reporting company, the law, the auditors' profession and the tax authorities.
2. Which of the undernoted influence (and in what order) the preparation of annual reports and the choice of reporting practices?: the laws of your country; your auditors and their professional body; the tax authorities; any competitors in your industry or markets; EC directives and proposals on accounting; the SEC in the US; the IASC; the OECD; and the UNCTNC. The results indicate that local national laws (61%), auditors and their profession (16%), and the SEC (10%) tend to predominate.
3. Who are the main users of annual reports and accounts and in what order?: the results indicate that shareholders (63%), financial market analysts (18%) and banks (9%) are the most important users, whilst tax authorities, trade creditors and government are the least important users.

## Structure of World Survey

The book has six main parts and two appendices. Part I includes the conclusions and recommendations covered later in this review; a ranking of companies and countries by the quality of information in annual reports; companies' preferences, influences and target groups; and the objectives, pronouncements and proposals for the IASC, the UN and the OECD.

Table 1 shows the top five companies and their scores and Table 2 shows the bottom five companies. Table 1 reveals a predominance of companies from English-speaking countries; the only exception in the top ten is BSN of France which ranked sixth. This dominance is earned on the basis of disclosure of accounting information practices whereas if the ranking is done by non-financial information reporting practices seven of the top eleven come from non-English countries especially West Germany and the Netherlands. The domination of West Germany in this area is because of the detailed employee information which is incorporated into corporate annual reports. In contrast, much of this information in France and Sweden is reported separately in special employee reports.

**Table 1**
**The Top Five Companies Ranked by Financial Reporting Practices**

| | | *Weighting* | | | | |
|---|---|---|---|---|---|---|
| | | *Accounting Score* [65] | *Non-financial Score* [25] | *Timeliness Score* [10] | *Aggregate Score* [100] | *Rank* |
| *Company* | *Country* | % | % | % | % | |
| BP | UK | 86.6 | 36.9 | 90.0 | 74.5 | 1 |
| CSR | Australia | 80.0 | 36.9 | 90.0 | 70.2 | 2 |
| ICI | UK | 85.3 | 34.2 | 50.0 | 69.0 | 3 |
| Unilever | UK | 84.0 | 30.1 | 40.0 | 66.1 | 4 |
| Provigo | Canada | 81.3 | 16.4 | 90.0 | 65.9 | 5 |

*Source*: *World Survey of Published Accounts, p. 33.*

**Table 2**
**The Bottom Five Companies Ranked by Financial Reporting Practices**

| | | *Weighting* | | | | |
|---|---|---|---|---|---|---|
| | | *Accounting Score* [65] | *Non-financial Score* [25] | *Timeliness Score* [10] | *Aggregate Score* [100] | |
| *Company* | *Country* | % | % | % | % | *Rank* |
| INI | Spain | 18.6 | 6.8 | 0.0 | 13.8 | 196 |
| Telco | India | 8.0 | 12.3 | 50.0 | 13.2 | 197 |
| Mahindra | India | 10.6 | 12.3 | 30.0 | 13.0 | 198 |
| ENI | Italy | 12.0 | 17.8 | 0.0 | 12.2 | 199 |
| Mitsubishi Oil | Japan | 6.6 | 10.9 | 40.0 | 11.0 | 200 |

*Source: World Survey of Published Accounts*, *p. 38*

In terms of timeliness the US and Canada scored the highest, not surprisingly given the existence of the 90 days filing requirement of the SEC.

At the other end of the spectrum, three of the bottom ten companies are Indian. A feature of these accounts is the lack of consolidated accounts, no funds statements, no value added statements and a distinct lack of information on segments of the business and poor accounting policy statement disclosure. These three Indian companies are all listed on the Indian stock exchange. Mitsubishi Oil, Japan also merits comment: '... its profile has the highest number of "no information" and "no disclosure" entries; its English-language accounts are little more than a pamphlet.'

Table 3 shows the world's major countries ranked by financial reporting practices. An important point is that the rankings of those countries

**Table 3**
**The World's Major Countries: Ranked by Financial Reporting Practices**

| | | *Weighting* | | | | |
|---|---|---|---|---|---|---|
| | *Number of Companies* | *Accounting Score* [65] | *Non-financial Score* [25] | *Timeliness Score* [10] | *Aggregate Score* [100] | *Rank 1989 (1980)* |
| | | % | % | % | % | |
| UK | 15 | 75.3 | 23.7 | 50.0 | 59.9 | 1 (4) |
| Australia | 13 | 75.7 | 16.8 | 49.2 | 57.0 | 2 (7) |
| Sweden | 6 | 70.4 | 23.7 | 46.6 | 56.3 | 3 (3) |
| Canada | 15 | 68.6 | 12.7 | 77.3 | 55.5 | 4 (5) |
| Netherlands | 12 | 66.2 | 22.0 | 50.8 | 53.6 | 5 (2) |
| USA | 25 | 64.3 | 13.2 | 76.4 | 52.7 | 6 (1) |
| France | 15 | 67.0 | 14.6 | 34.6 | 50.6 | 7 (6) |
| South Africa | 10 | 55.8 | 24.7 | 60.0 | 48.5 | 8 (10) |
| Hong Kong | 4 | 58.3 | 7.8 | 45.0 | 44.3 | 9 (8) |
| Japan | 19 | 55.7 | 6.4 | 46.3 | 42.4 | 10 (12) |
| Italy | 10 | 56.7 | 9.5 | 25.0 | 41.8 | 11 (14) |
| Switzerland | 10 | 50.8 | 18.6 | 38.0 | 41.4 | 12 (11) |
| Belgium | 9 | 46.9 | 15.6 | 37.7 | 38.2 | 13 (13) |
| Germany | 15 | 42.6 | 25.7 | 33.3 | 37.5 | 14 (9) |
| Spain | 5 | 27.2 | 17.2 | 30.0 | 24.9 | 15 (15) |
| India | 3 | 9.7 | 11.8 | 43.3 | 13.6 | 16 (—) |

*Note:*
1. Countries from which there are fewer than three companies in the sample have been excluded.
2. For the purpose of the country ranking, the scores of Shell and Unilever are included in both The Netherlands and the UK.

*Source: World Survey of Published Accounts*, p. 48.

with less than three companies is excluded because of concern over their reliability. The main conclusions are summarised later.

In any survey some results emerge that just do not look right. This survey is no exception. What seems peculiar in this survey is the ranking of Volvo. Cairns, Lafferty and Mantle (1984) in their analysis of 250 of the world's largest companies found that there had been a great improvement in standards of reporting over the previous five years, particularly because of the influence of international accounting standards. They concluded that there is '. . . no doubt that standards of financial reporting are highest overall in the United States, but its lead over Canada, the Netherlands, Sweden and the United Kingdom is small' (p. 1). However, in ranking companies no Swedish entities came in either the top 25 or in the bottom 25. In contrast, when Stilling, Norton and Hopkins (1984) analysed the annual reports of 175 companies of international importance from 19 countries, Volvo was ranked first. In addition, Cooke's (1989a) analysis of 90 Swedish corporate annual reports based on 224 disclosure items ranked Volvo first. In contrast, *World Survey* ranks Volvo last of the six Swedish companies in their sample and 83rd out of the 200 companies. In all three aspects—accounting score, non-financial information and timeliness—Volvo's accounts are reported as being inferior to their Swedish rivals. Our analysis suggests that Volvo's accounts have not deteriorated in relation to other major Swedish companies.

Part I of *World Survey* also includes two pages by Lorraine Ruffing of and on the United Nations Centre on Transnational Corporations. Ruffing makes the following observations:

> At the present time it is still difficult to compare the performance of transitional corporations because of different national accounting standards. In addition, many transnational corporations continue to be selective in the type of information they provide, it was surprising, for instance, that a number of the 1987 corporate annual reports were completely silent on the impact of the 19 October 1987 crash on their operations (p. 71).

The two books reviewed in this essay do not refer to this event nor the absence of disclosure of the event in the annual reports of the companies in the sample.

Part II of *World Survey* covers consolidated financial statements, funds statements, segmental information, the effects of changing prices and management responsibility. With respect to management responsibility, *World Survey* (p. 173) suggests that a statement of such responsibilities '. . . has a positive value to users of financial statements and a statement should be included in the annual report of all major companies'. In relation to Sweden, Cooke (1989b, p. 11) has noted that 'the concept of wider corporate financial accountability is also manifest in the audit report and the scope of audit. An audit in Sweden extends to a review of the company's administration by the managing director and board of directors. Such a requirement is only stipulated in Sweden and Finland. If the auditors have cause for concern about the company's administration an appropriate criticism should be included in their report. Another feature of the audit report is that a statement has to be made discharging the managing director and the board of directors from any liability for their administration during the review period'.

Part III covers the disclosure of accounting policies and includes a discussion of off balance sheet financing. Contrary to what was indicated in Chapter 1, IASs are used in this part as a framework for evaluating the level of disclosure in respect of off balance sheet items. The items treated under this heading include contingencies such as bills discounted, factoring of debts, related party transactions and leasing. Nothing is reported in respect of the use of many recent devices under the caption of financial instruments. Part IV deals with auditing and auditors.

Part V on non-financial information is a pioneering study of the different ways reporting companies disclose their social and community responsibility. Although political and economic factors which might have influenced the behaviour of the companies in the sample were not discussed, there is sufficient space given to the description of the many ways by which companies provide non-financial information. The coverage includes: employee information such as benefits and trade union relationships; environmental protection and pollution control; use of energy; operating data in volume and analysis of shareholders and share performance. Surprisingly, however, value added statements are classified as non-financial information and treated in this section. From reading this Part, one gathers the impression that non-financial information is concerned with employee matters rather than transfer pricing and transfer of technology from one part of the world to another.

Part VI deals with the timeliness of annual reports. This section concludes that companies had become no more prompt in publishing their annual reports than they were in the 1980 survey. This book and *International Trends* conclude that companies in many countries outside the US take longer than 90 days after the accounting year end to publish annual reports. *International Trends* provides three reasons for this delay: (a) stock exchanges and government authorities in many countries allow longer lead times to file annual reports, (b) an English-language version of a foreign annual report is produced later than the local language version, and (c) the consolidated version of an annual report is similarly available later than the non-consolidated version.

## Main conclusions of World Survey

A significant factor in the background of this book is that the 1980s have been characterised by increasing internationalisation of financial capital markets. Indeed, 'since 1980, a most fundamental change and one which is reflected fully in the approach to this survey, is the move internationally away from regulation of markets, in fact, deregulation is almost the byword of the 1980s and promises to continue into the 1990s. All of the financial statements of the companies... reviewed have therefore been published in a climate of increasing freedom in the markets for the products and services which these companies sell; and increasing freedom in the international capital markets in which these companies raise funds' (p. 3).

Some deregulation measures that have been implemented worldwide are documented by Cooke (1988). It is important to note that deregulation often disturbs an equilibrium and thus leads to greater regulation in other areas. For example, deregulation in the banking sector has permitted banks to indulge in off balance sheet financing. As a result, demands have been made for additional regulations or improved regulation of commercial banks by central bank monitoring units. In the UK, deregulation in the securities sector has led to the formation of six self-regulating organisations under the auspices of the Securities and Investments Board. Demands are also emerging for greater regulation in other key areas, such as trading using price-sensitive information and accounting standards.

*World Survey* suggests that the new deregulated environment has been '... reflected in company financial reporting practice by increased emphasis on informativeness, or disclosure practices' (p. 8). Having seemingly established that deregulation had led to more emphasis on informativeness or disclosure practices the second conclusion somewhat surprisingly finds that '... there has been very little overall improvement in reporting practices over the period from 1980 to 1988, and in some areas, such as segmental disclosure, omission of subsidiaries from consolidation, inflation accounting, timeliness of publication and disclosure of inventory cost formulae, there have been definite moves backwards'. In the same vein, *International Trends* observes the widest gaps in financial reporting worldwide in (a) reporting of subsidiary company information, (b) disclosure of segment and geographic information, (c) disclosure of R & D costs and capital expenditure and (d) disclosure of earnings per share. Despite these differences, it further observes considerable improvement in financial reporting practices and increased adherence to international accounting standards. However, it suggests that the factors leading to the improvements are the globalisation of capital markets and the efforts of international, regional and national accounting regulatory bodies.

The third major conclusion is that the variability in reporting practices across companies is very high particularly in the treatment of non-consolidated subsidiaries, goodwill and the definition of funds used in funds flow statements. This variability has increased since 1980.

## Why has the US declined?

One major finding of *World Survey* is the decline of the US from first place in 1980 to sixth in 1988 and four main reasons are put forward to explain this. Firstly, the extent of disclosure was restricted to the corporate annual report whereas the 1980 survey extended to the SEC 10-K filing forms. Secondly, US companies have become increasingly reticent about full disclosure of their accounting policies, leaving too much to be implied from the US regulatory environment. In consequence, accounting policies in certain 'significant areas' are not adequately disclosed. Thirdly, US companies have shown a considerable lack of interest in accounting for inflation—a situation not so prevalent in 1980. Fourthly, US corporate reports lack disclosure of non-financial information such as employment reporting.

## Global reporting practices

The following represent areas of strength and weakness in reporting practices as identified in *World Survey*.

(1) Consolidated accounts were provided by 91 percent of sample companies compared with 83 percent in 1980.
(2) There was an improvement from 83 percent in 1980 to 98 percent of sample companies in the disclosure of accounting policies. However, full disclosure of accounting policies has declined in favour of abbreviated statements that assume knowledge of a reporting company's national requirements.
(3) The closing rate method for translating the balance sheets of overseas operations now predominates—62 percent in this publication compared with 32 percent in 1980.

(4) There is an increasing tendency for companies' auditors to mention the auditing standards adopted—68 percent compared with 36 percent in 1980. However, 79 percent fail to state which country's auditing standards have been followed; presumably those of the country in which the parent is based.

*Areas of weakness*

(1) Three percent of the sample companies do not publish an auditors' report compared with six percent in 1980—an improvement but still a rather high statistic if users are to rely on the numbers reported in a corporate annual report.
(2) A sizeable proportion (46 percent) do not publish their corporate annual reports within three months of the year end, compared with 40 percent in 1980.
(3) Segmented operations are disclosed only by a minority of companies (16 percent compared with 12 percent in 1980).
(4) Thirty-five percent of companies with foreign operations fail to disclose the treatment of foreign currency movements.
(5) The majority (65 percent) of companies fail to disclose their pension expensing policies, compared with 50 percent in 1980.

## Major changes in practice

*World Survey* concludes that, in general, reporting practices have improved although there are some important areas where disclosure levels have deteriorated or where the variability in practice has improved. Areas where variability has increased include accounting for goodwill, treatment of non-consolidated subsidiaries and definition of funds in funds flow statements.

Laidler (Chapter 15—Business Combinations) notes that goodwill arising on consolidation is treated as a permanent asset in the balance sheet by only seven percent of companies compared with 56 percent of companies which write off goodwill immediately or amortise it. The selection of the number of years over which goodwill is amortised seems related to country specific criteria rather than company specific criteria. Options therefore differ by country, perhaps demonstrating cultural differences. This variability in practice is hardly surprising when IAS 22 is very flexible in this area and there is a variety of country specific recommendations (Cooke, 1988). For example, SSAP 22 in the UK prefers the write off of goodwill on acquisition although amortisation over its useful life is possible. Such flexibility also exists in the Netherlands with a recommendation that goodwill should be amortised over a period not normally exceeding five years. However, the period of amortisation may be extended to 10 years where there are good reasons to do so. Goodwill can be amortised over a period not exceeding five years in Japan, Italy, West Germany and France in most instances. The amortisation period can be as long as 10 years in Sweden and Italy (though it is generally reduced to five years for tax purposes), 20 years in Australia provided benefits are still arising, whereas in Canada and the US the maximum period is 40 years.

The second area of concern identified is the existence of non-consolidated subsidiaries, particularly in West Germany. The survey notes that 27 percent of German sample companies (33 percent in 1980) consolidated only their domestic subsidiaries. Subsequent to this survey, section 290 of the Handelsgesetzbuch (HGB, Commercial Code) now stipulates that domestic corporations which are regarded as parent companies must prepare consolidated accounts and include in those accounts all domestic and foreign subsidiaries which are under common control and management. Subsidiaries are, *inter alia*, those enterprises in which the parent company holds a majority of the voting rights or where that parent company can exercise a controlling interest (Cooke, 1988, p. 200).

The third area of concern was the variability in the definition of funds in funds flow statements. Again, this is not surprising. Many countries (for example, Sweden and Japan) have been influenced considerably by reporting requirements in the US. Consequently, a working capital concept was often adopted. However, throughout the 1980s there has been a movement in the US away from the working capital concept towards a cash flow concept. This culminated in the issue by the FASB in November 1987 of SFAS No. 95 'Statement of Cash Flows' which superseded the requirement for a statement of changes in financial position and replaced it with a requirement for a statement of cash flows. Whilst SFAS 95 was not in force for the year-end covered by *World Survey*, practice had already begun to move towards a cash flow statement. *International Trends* reports that 'in roughly half of the countries studied, a working capital method is used in the statement of changes in financial position. This is true for companies in the following countries: Australia, Finland, France, Hong Kong, Italy, Japan, South Korea, Malaysia, New Zealand, Norway, Singapore and Spain. Several others (Mexico, the Netherlands and Sweden) use modified cash as the basis for this statement. In the UK, net borrowings are used and in the US and Canada, a cash basis is used. For companies in Denmark, West Germany, South Africa and Switzerland, there is no majority policy (Chapter 3, p. 5).

## Overall assessment

Both books are of considerable interest. *International Trends* provides a renewal of the database for research into the level of corporate reporting across the world. It improves on previous efforts by its painstaking attention to detail and the scope of new issues covered. It also provides a useful aide mémoire for preparers of corporate reports. It is a thorough and extensive book which will meet the needs of both academic researchers and practitioners in this field and would most probably become their handbook.

*World Survey's* attempt to undertake a comparison of published reports of the world's leading companies is, at the very least, extremely ambitious. In many respects the methodology is somewhat weak and the conclusions need to be treated with considerable caution. Are such small samples representative of corporate reporting in a particular country? Are transnational corporations representative of companies in a country? In short, the book is a less than rigorous attempt to come up with a methodology for the global comparison of corporate annual reports. It is an example of the work produced in this yet immature field, and carries some of the typical deficiencies to great lengths. Perhaps the book should be treated as a report of a pilot study—a very expensive report at that! Despite this fact, the descriptive portion of the survey contains many valuable illustrations. Thus, professionals interested in how best to present information in corporate annual reports should not dismiss it.

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# Book Reviews

**Debating Coal Closures.** *David Cooper and Trevor Hopper* (eds). Cambridge University Press, 1988. vi + 288 pp. £30.00.

This book contains ten papers written by a variety of academics at the time of the 1984/85 miners' strike, together with an introductory chapter by the editors, who helped co-author one of the contributions. These papers constitute the bulk of academic contributions to the pit closure debate from an accounting/economics standpoint. Whilst each chapter is concerned with some aspect of economic calculation in the coal dispute, the most interesting parts to us were the authors' postscripts and the editors' introduction, for these are attempts to re-appraise opinions in the light of later events and at a sobering distance from the battle. Perhaps it is remarkable how few changes—even moderations—of view have occurred.

The book is thus an interesting collection of views which reinforces our beliefs that a writer's values will influence his or her conclusions and that the social sciences can never become as 'scientific' as the natural sciences. The book may be viewed as a pedagogic exercise which exposes the limitations and partiality of accounting and economics by applying their techniques to a particular, well-documented, controversial case. As such it could be used as cautionary material on undergraduate or MBA accounting and economics courses, or as specialist supplementary material for an industrial relations or politics course.

With the benefit of four years' hindsight, what does the book tell us about the coal dispute, UK energy policy, and mainstream accounting and economics? Introduction apart, the contributions are arranged in three parts: firstly the economics and accounting of the NCB, secondly the strategies of the NCB's management, and finally the context of the dispute. In the first section there are three 'cost-benefit' approaches from Davies & Metcalf, Minford & Kung and Glyn. Making different assumptions as to the employability of redundant mineworkers, they reach different conclusions as to the social desirability of pit closures. A contribution by Robinson assesses the appropriate size of the UK coal industry in the light of current market prices, which are effectively assumed to be 'correct' and to apply to the NCB's sales to the CEGB, which takes some 70% of its output. Like the remaining contributors to this section (Berry *et al.*), Robinson advocates the use of avoidable cost to decide which pits should close. Unlike Robinson, Berry *et al.* do not have faith in the information content of coal market prices or their applicability to most of the NCB's sales.

In the first of the two contributions in the second section, Kerevan & Saville argue for the continuation of deep coal-mining in Scotland, believing that British Coal's managers are wrong to cut capacity in the face of a short-term excess of supply over demand. They argue that such actions are typical of the strategic mistakes made by much of British industry following the oil shocks of 1973 and 1979, and lead into a downward spiral of decline in which each upsurge in UK demand has to be met by imports, because indigenous capacity is no longer there. The other contribution in this section, by Cutler *et al.*, makes similar points but includes a more lengthy consideration of the coal v. nuclear power generation debate, which is decided in coal's favour on cost and environmental grounds.

In the final section of the book, Robinson makes a further contribution, using marginal analysis to show that there is an argument for pit subsidies, on a case-by-case basis, within the Government's Medium Term Financial Strategy. Such subsidies, particularly if combined with wage restraint, might increase the number of miners who could be profitably employed within the coal industry while saving the Exchequer unemployment pay. Next, Fothergill makes a powerful case for an immediate moratorium on the building of new nuclear power stations, and for the expansion of the coal industry within a UK energy policy that is not dominated by short-run profit considerations. Finally, Burns *et al.* argue that the miners are being squeezed in two ways: capacity is being expanded in the large pits in the central coalfield at the expense of employment in the labour-intensive peripheral pits, but labour is also being shed in the central pits through automation and changed work-patterns to ensure that the high fixed capital costs of the strategy are recovered.

To us, two conclusions follow from reading this book. The first is simply that the sterilisation of existing coal reserves by pit closure in a drive for short-run profitability and privatisation is at best short-sighted. The second is that the comparative lack of impact of these well-researched and argued papers says something about the difficulties that academics encounter when trying to inform, and so to influence public policy debates. This latter is partly due to their 'fire-fighting' approach and the politically controversial nature of the subject. But, also, for such analyses to be meaningful, and so worthy of serious consideration, they must be understandable, contain true information, be expressed in an appropriate way, and be put forward by someone who has valid claims to legitimacy and trustworthiness.

Most of these papers would be difficult even for the 'intelligent layman'; accounting and economics do not offer a single and unquestionable truth; the papers were not widely and freely available to the public during the dispute; academics are not publicly elected or widely admired by the public; and the independence of many of the book's contributors was arguably tarnished in the public's mind by their relations with one or other of the main protagonists. This latter point was exploited by British Coal, not least in their public interpretation of the report they commissioned by Custis *et al.* in response to Berry *et al.* Equally, the equivocal notion of truth can be exploited by using claims to superior 'inside' knowledge to which outsiders are not privy.

It would appear from these papers and others' reactions to them that political issues cannot be divorced from accounting and economic analyses, and that accounting systems are a means whereby the powerful are helped to observe the less powerful, but not vice versa. The lack of impact on public policy of these attempts at 'social accounting' offers little comfort for those who hold a pluralistic view of society.

University of Warwick — Stan Brignall and Lin Fitzgerald

**Advanced Accounting.** *Floyd A. Beams*. Prentice-Hall International, 4th ed., 1988. xii + 968 pp. £18.95.

This is the fourth edition of Beams' *Advanced Accounting*, which first appeared in 1979. Following previous editions, this latest edition is strongly student oriented, which gives it both its strength, i.e. readability and clarity of presentation, and its weakness, i.e. a concern for procedural methods at the expense of more theoretical content.

The present text contains 21 chapters, of which 15 deal with business combinations, including consolidations, branch operations, foreign currency translation and segment reporting. In particular, the consolidations chapters exemplify the author's comprehensive coverage of subject matter and ability to make complex technical problems readily understandable by students. Chapter 11 on consolidation theories contrasts existing consolidation practices (the so-called contemporary theory) with the conventional parent company theory and entity theory approaches to consolidation. The reader is introduced to the term 'push-down accounting', used to refer to the recording of fair values in the separate financial statements of a wholly or substantially owned subsidiary, i.e. the fair values are 'pushed down' to the subsidiary's statements. Chapter 11 ends with a discussion of consolidation procedures under current cost accounting.

Of the remaining six chapters, two deal with partnership accounting, one with the various forms of company reorganisations and three with government and non-profit organisations.

The accounting teacher in the UK or Australia is unlikely to adopt this US text, in spite of its strong features. One reason for this lies in the differences in institutional and financial infrastructure, regulations and professional standards as well as business practices in these countries. Perhaps a more important reason can be found in their different approaches to teaching advanced financial accounting at the undergraduate level. Typically the British and Australian students in this course are exposed to a greater range of theoretical and regulatory issues, including standard setting processes, accounting measurement and valuation theory and, in some cases, recent developments in accounting research.

Sydney — Ronald Ma

**Edward Stamp—Later Papers.** *Michael J. Mumford (ed.)*. Garland Publishing, 1988. xi + 115 pp. $30.

The late Professor Edward Stamp's *Selected Papers* were published by Garland in 1984, edited and with an Introduction by the author. They formed an impressive record of the range and versatility of his work, as well as being entertaining reading, by dint of the author's aphoristic and polemical talents. Following his sudden and premature death early in 1986, a collection of papers published in the last two years of his life has been selected by his colleague, Michael Mumford, and is published here together with a number of obituaries and tributes.

Inevitably, *Later Papers* is a slim volume, relative to the weighty *Selected Papers*, and this applies to the content as well as the quantity. The reason for this is obvious: less than half of the 115 pages contain writing by Eddie Stamp. Amongst these, apart from occasional pieces, addresses and journalism, which he did so well but which are peripheral to his main work, there are only two papers which promise an original contribution. One of these is the National Coal Board report, co-authored with Messrs. Custis, Morpeth and Tweedie, which is essentially a critique of research by others (David Cooper and his colleagues). It is an interesting exercise, and the controversy which surrounds the episode (particularly on the use of accounting data to justify pit closures) may be of lasting interest to students of the political role of accounting and accounting research, although the report does not attempt to make an innovative contribution to management accounting. A second paper which promises some substance is on 'The Politics of Professional Accounting Research' (reprinted from *Accounting, Organizations and Society* 1985). This is a retrospective view of Eddie Stamp's personal experience of work on professional accounting research committees, notably in working on *The Corporate Report* (1975) in the UK and *Corporate Reporting: Its Future Evolution* (1980) in Canada. The factual material will be of interest to students of the history of accounting thought and policy, but of more general interest is the author's conclusion about the professional committee process: 'Solutions of this kind are not "scientific" and the process owes little to science. The technique is political and the paradigm is jurisprudential' (p. 42). This gives a clue as to what is missing from this book: the incomplete major project which was Eddie Stamp's central interest during the later years of his life. This was a study of jurisprudence as a method of explaining and directing the development of accounting policy, and is described briefly by Michael Mumford, in his Preface (pp. ix–x).

Despite the inevitable disappointment that the main author's contribution does not do full justice to his work and thought, it must be said that the obituary notices and tributes by others exceed expectations. Eddie Stamp's vivid personality and wit seem to have inspired his colleagues to transcend the constraints of the conventional obituary and a very full and incisive picture of his personality emerges. The memorial address given by his last Vice-Chancellor, Prof. Harry Hanham, (pp. 90–4) is particularly good, and notably free from any false sentiments or pretensions which the subject of the address would have despised.

In summary, this book can be recommended as interesting (and entertaining) reading to anyone who knew Eddie Stamp or is interested in his work, but it is stronger as a tribute to the author than as a representation of his own work.

Cambridge University Geoffrey Whittington

**Discounting in Financial Accounting and Reporting: Issues in the Literature.** *Rai Aggarwal and Charles H. Gibson.* Financial Executives Research Foundation, 1989. 141 pp. $6.00.

This study provides a review of the accounting literature on the use of discounted present value concepts in financial accounting. For this purpose, literature covered comprises accounting statements and standards issued by the FASB and the SEC, as well as professional and academic books and articles. Four chapters deal, respectively, with the early accounting literature, recent accounting literature, official conceptual schema, and accounting standards. A fifth chapter provides examples of problems in applying discounting. A selected annotated bibliography is also provided.

The study is undoubtedly an interesting and useful contribution to the literature. Having just co-authored a research study on the very topic (*Discounting of Assets and Liabilities in Published Corporate Reports*, ICAEW, in press), this reviewer is well aware of how thoroughly Aggarwal and Gibson's survey has been carried out—and frustrated that it was not available at the commencement of his own study. The review of the views of different writers, from Irving Fisher to the present day, is extensive and although presented without synthesis or comment, provides a useful source of references for those interested in the subject. Library purchase for student use is clearly warranted for this reason alone.

The two chapters dealing with professional pronouncements also provide useful summaries of proposals for and against discounting which this reviewer, again, would have been glad to have had access to, if only to reduce the amount of often extremely tedious reading needed to identify discounting applications in practice. There are now far more situations requiring or permitting the use of discounting in the USA than most British accountants probably realise.

Chapter 5 provides examples of problems in applying discounting. This chapter adds little, for it almost entirely consists of recitations of arguments advanced in earlier chapters. It does enable the reader, though, to identify the various suggestions on a particular topic (pension liabilities, say) without wading through the other chapters.

The authors do not attempt to weigh and balance the merits of the different arguments for and against the use of discounting in financial accounting, nor even to attempt to classify or bring out the different assumptions underlying contrary positions. Consequently the book is not (nor, in fairness, do the authors claim otherwise) a scholarly review of the subject. For this the reader must look elsewhere. An 'executive summary' does highlight some key issues involved in applying discounting, but it is not easy to trace the arguments which are advanced there to material appearing in the following chapters. Nevertheless, it makes sensible reading.

All in all, this is a useful bibliographical exercise: hardly suitable as a textbook, but certainly a book to order for the library.

Lancaster University K. V. Peasnell

**Financial Management, Method and Meaning.** *Anthony G. Puxty and J. Colin Dodds.* VNR International, 1988. xxii + 536 pp. £15.95.

This is one of a series of introductory texts aimed at students on the first year of accounting or business degree courses. The others in the series deal with financial accounting and management accounting.

A noticeable and useful feature of the text is the fact that it really comprises two books. The first part is a straight textbook on financial management, whilst the second part, comprising 260 pages, is a workbook and is much more difficult to categorise. This consists not only of further descriptions of some of the areas covered but also discussion questions, numerical questions, case studies and some reproduced articles. This separation into two parts adds considerably to the usefulness of the text. The first part can be used as a stand alone text, or lecturers can decide to use some or all of the workbook either for student self-assessment purposes or as the basis for tutorials.

The initial text comprising twelve chapters is divided into two main sections. The first, or chapters two to six, consists of a description of the investment decision as taken by both companies and individuals. These chapters build up from an analysis of the situation of no firms and no risk to the realistic situation of a risky world populated by firms. Thus chapter three explains the principles of discounting, NPV and IRR with a brief discussion of the pros and cons of each method. Chapter four, rather confusingly labelled 'the risky world no firm case', looks at portfolio theory starting with an extensive discussion and illustration of the two share case and finishing with a brief discussion of systematic and unsystematic risk in the n-share case. Chapter five then moves back to the riskless world but examines investment decisions from the perspective of firms. This is one of the poorer chapters, as many might argue that rather less emphasis should have been placed upon payback and accounting rate of return and more on the effects of capital rationing, inflation and taxation, although some of these deficiencies are rectified in the workbook. The section then finishes with a discussion of the capital asset pricing model.

The second main section deals with financing decisions. It begins with an examination of efficient markets what is meant by market efficiency, types of market efficiency and tests of efficiency. The authors do not appear to approach this question from any strongly held position and the overall conclusion of the chapter is that large markets are probably, in general terms, semi-strong efficient. Chapters eight and nine look at long-term and short-term financing decisions, the interrelationships between the two and the factors affecting the choices of sources of finance. Chapter ten examines the dividend policy decision whilst chapter eleven looks at the costs of alternative sources of funds and the effects of capital structure upon the cost of capital, finishing with the Modigliani and Miller approach with taxation and bankruptcy costs.

The style and types of material contained in the workbook chapters vary considerably from chapter to chapter. So, for example, chapter one consists mainly of three case studies, including a brief case of the attempted take-over of Union Carbide which raises interesting questions concerning the economic effects of take-over bids. However, the third case, that of the take-over bids by GEC and Racal for Decca, which reproduces the full accounts, notes to the accounts and directors' report of Decca appears to contain too much detailed information for the average first year student to understand. Chapter two instead concentrates upon providing further information to that contained in the main text: in particular why big bang occurred, effects and a description of the increasing globalisation of capital markets. It is in chapters such as this and, to a lesser extent, chapters eight and nine on long-term and short-term financing, that this case book is at its weakest. One is left wondering why, if this new material is important, it is not a part of the main text and, if not important, why it is placed in the book at all. However, in other chapters such as the case studies or chapters three and four which provide additional mathematical explanations and examples of project investment analysis and the effects of portfolio diversification on expected risk and return, the workbook adds significantly to the value of the text.

To be one of a series is both a strength and weakness. If students use more than one of these books then their familiarity with the style and layout makes use of the text much easier. However, the frequent references to the other books in the series must be at times rather annoying for students who use only this one. In addition, perhaps because it is assumed that all three will be used, insufficient attention is paid in places to explaining terms and concepts that many students may be unfamiliar with.

Overall, however, this is a well written and extensive text. Certainly it should be warmly welcomed by anyone looking for a text that covers UK rather than US material in a generally informative manner, and it offers a real alternative to the current texts in this area.

University of Glasgow Clare Roberts

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**Bank/Corporate Relationships.** *John Holland. ACCA Certified Research Report 12,* 1988. 49 pp.

This forty-nine page research report by John Holland tackles the interesting and little researched area of bank/corporate relationships for the small and medium-sized firm sectors. The basic aim of the research is to: 'identify problems incurred when managing banking relations and to develop methods to manage such problems' (p. 3).

Whilst the present research goes some way towards meeting the objective, the author acknowledges that it must be seen as the first stage of a programme of research. The reader should not hope to take away too many insights from such a foundation building research effort.

The research report begins with a very comprehensive executive summary. This lays out the major conclusions of the research and then details the content of the three main chapters. Given the coverage in the executive summary and the rather sketchy presentation of the research findings in the main chapters, the interested but busy reader could well make do with the executive summary.

The first chapter considers the strategies of banks for dealing with small and medium-sized firms. The identities of individual banks are not disclosed and this is the first indication of the research falling between at least two stools. The lack of detailed information on the strategies of individual banks leads the findings to have little relevance for practitioners, whilst the sketchy reporting of research results from a few case studies will do little to encourage the academic reader. The chapter describes a few of the commonly known current trends in banking activities, the move to corporate centres for MNCs and regional centres for medium sized businesses, with a lack of additional supporting evidence or insights. This may, however, be doing the chapter a disservice. For it could be read as a backcloth against which the results of later chapters are to be interpreted.

The second chapter concerns itself with small businesses and banking relations. The chapter begins with a general framework for the influence of environmental and small business factors on banking relations. The reader is merely told that the factors were identified from the case studies. Small business factors such as knowledge of financial decision making, personal aims of the owner and rate of growth are all seen as directly influencing the choice of bank and the nature of banking relations. Having pulled these factors seemingly out of 'thin air', the chapter moves on to consider the relationships between the factors and their impact on decision-making. The small business approach to sourcing finance is portrayed as a purchasing model—initiation and stimulus, search, negotiation and choice. Again the lack of supporting evidence for the derivation of conclusions is far from satisfactory.

Having derived the model, the chapter adds detail to each of its component parts. For example, a growth in business demand is seen as one reason for going to a bank or changing to another bank. Once the model has been described more fully, it is used to look at the banking relations of three small firms. These are interesting and would prove useful as a teaching vehicle for discussing the problems faced by small firms in sourcing finance. However, I am far from clear of their research worth. They read as a set of stylised stories rather than examples of the in-depth case study method. The chapter finishes with a consideration of the role of the accountant as an intermediary between small firm and bank. A number of arguments why accountants might fulfil an important intermediary role are presented; for example, small businesses may lack expertise in the finance/accounting area and have little knowledge of how to deal with bankers. With no direct supporting evidence the chapter concludes that:

> It is clear from these interviews that accountancy firms feel that there is a significant role for them in helping small business and middle corporate clients to deal with their bankers.

Chapter three describes the relationships between medium-sized firms and banks. It follows roughly the same format as the prior chapter and suffers from some similar weaknesses. For example, when describing the active approach to managing banking relations it is unclear how many firms (0 to 5) made use of the various subcomponents of the approach. The reader instead is informed that: 'The method outlined below was rarely employed in the middle corporate cases in an explicit and comprehensive manner' (p. 36). As for the previous chapters, whilst the case studies make for interesting reading their research contribution remains open to doubt.

Overall this is a brave attempt to develop an initial understanding of an important research topic. The research methods adopted and the form of presentation do little, however, to support the descriptions given. In its present form the research report would provide a useful teaching document for small firm finance courses.

Kevin Keasey
Warwick Business School

**Accounting for the Human Factor.** *Lee D. Parker, Kenneth R. Ferris and David T. Otley.* Prentice-Hall of Australia, 1989. 212 pp. A$32.95

The authors of this book correctly point out that accounting is a social artefact—a product of human invention that is designed by humans for human purposes. They have put together a timely and useful text that acts as a convenient collection of certain theoretical arguments and empirical studies on the human aspects of accounting. As such, it is well-suited as a pedagogical instrument, particularly at the postgraduate level.

The book is divided into ten chapters. Chapter 1 is an introductory chapter that briefly argues that accounting should be studied as a social enterprise as opposed to a mere technique composed of a set of algorithms. Chapter 2 is a summary of some major concepts and theories of individual, group and organisational behaviour. This chapter draws upon work in cognitive psychology, social psychology and organisation theory and introduces readers to ideas such as human perception, attribution, motivation, group processes and organisational concepts of culture and corporate design. Chapter 3 then discusses selected aspects of accountants as actors within organisations. Issues discussed in the chapter include: the image of accountants held by other professionals, the level of motivation, job satisfaction, role conflict and stress experienced by accountants, and the tension between the professional and organisational roles of accountants. Chapters 1–3 constitute a section entitled 'accounting and accountants in organisation'.

Chapters 4 and 5 focus on the human factors that should be taken into account in the design of budgetary control systems and the behavioural consequences that arise when budgets are used in individual performance appraisal and organisational (specifically divisional) performance measurement. Chapter 6 discusses the individual and organisational factors associated with the provision of audit information. Topics covered include the influence of organisational characteristics upon auditor attitudes and performance and the effect of auditor characteristics (for example, leadership style) upon the performance of the audit team. Chapters 4–6 make up a section entitled 'accounting interactions with participants, users and auditors'.

Chapter 7 makes some reference to the human factors involved in the mass communication of accounting information to shareholders but is essentially a description of accounting as a communication system. Chapter 8 discusses employee reporting, disclosure to trade unions and human resource accounting, while Chapter 9 focusses on accounting for the social impact of organisations. Chapter 10 briefly introduces what are termed 'political and political economy theories' of accounting that theorise accounting as a product of social and historical forces, as a vehicle for ideological propaganda and as a medium for the exercise of power. Collectively, Chapters 7–10 comprise a section entitled 'the broadening accounting constituency'.

The book is better suited for postgraduate rather than undergraduate courses. This is because its strength lies in the provision of summaries of predominantly positivistic research in selected topic areas: the provision of budget information, audit information, information to employees and social impact information. As a collection of brief reviews, the book succeeds. As a coherent argument, it struggles. Chapter 2, for instance, is not referred back to and drawn upon in subsequent discussions of research findings. Similarly, Chapter 3 appears disconnected from the preceding and subsequent chapters and its purpose is unclear. Were the authors seeking to demonstrate some of the human issues that become important once accounting is recast as a social artefact? If that was the intention, Chapter 3 is inadequate as it focusses only on individual 'variables' such as satisfaction, role conflict, etc. and ignores social issues like the extent to which accounting affects the distribution of resources and prevailing interpretative schemes in organisations and societies (matters investigated by authors cited in Chapter 10). And finally, Chapter 7 is distinctly out of place. The bulk of the chapter presents a general model of accounting as a communication system. The presentation of such a model in the middle of the book is strange, and the authors should have persisted with what appears to have been the original intention of the chapter—to discuss the human factors associated with the mass reporting of accounting information to shareholders.

There are also difficulties with individual chapters. Given the amount of research documenting budgeting as a political, symbolic and ritualistic process, it is surprising that the authors devote no more than a page to the matter in Chapter 4. Also Chapter 10 is not about reporting to a wider constituency (the section to which it belongs) nor is it about the social, political and organisational context of accounting (its title). It is an attempt to review literature that has a radically different approach to accounting for the human factor. The inclusion of this material takes the reader to the forefront of issues currently being discussed in research journals—thus ensuring that the text is 'up-to-date'. However, because the different assumptions underlying this body of work are not discussed in depth nor comparisons made between such work and that which has been discussed in Chapters 4–9, the distinctiveness of this more recent literature is muted and Chapter 10 stands as a rather odd conclusion in the book.

Finally, a note on the exercises set. In general, they were interesting and innovative, requiring the reader or student to reconsider the accounting function. However, some exercises were obviously intended to promote detailed analyses of particular articles. Since these articles do not accompany the text, the book is perhaps more suited for use on smaller postgraduate courses where access to library resources is less of a problem.

University of New South Wales

Wai Fong Chua

**Accounting in Eighteenth Century Scotland.** *Michael J. Mepham.* Garland Publishing, 1988. 531 pp. $90.

This is an excellent book, and a significant and substantial contribution to the study of accounting history. As Dr. Mepham explains, the book is 'organised around a survey of 18th century Scottish accounting texts, an analysis of their exposition of the Italian Method of Book-keeping and their treatment of certain selected topics'. However, 'where convenient and relevant', an attempt is made 'to compare the textbook methods and theory with contemporary accounting records'. In carrying out his programme, the author has brought together a mass of material, through which he guides the reader with his own comments, insights and suggestions. The work is meticulous in giving sources, and in providing bibliographical information about the books examined.

After setting the scene in the opening chapter, the second chapter tells us about 'authors, teachers and practitioners', supplemented by two valuable appendices, one on teachers of book-keeping in Edinburgh, and the other on accountants in that city. Then follow chapters on the four leading authors: Alexander Malcolm, John Mair, William Gordon and Robert Hamilton, who together constitute what has been called the 'Scottish ascendancy'. The first section of the book ends with a long chapter on Scottish accounting texts up to the end of the eighteenth century, with reproductions of title pages. The next ten chapters deal with specialised topics: to mention but three—'Balancing the Books'; 'Farm Accounts'; and 'Robert Hamilton and the Origins of Cost Accounting'.

A final 'summary chapter' draws the threads together. It concludes with the expression of the view that the best of the Scottish books on book-keeping and accounts, although they '*were* practical, technical works', also were 'part of the general intellectual ferment of the Scottish Enlightenment and should be seen as part of this movement which produced the more renowned works in economics, philosophy, law and science'. This is an interesting and provocative claim, and I trust that it will induce reflection in some of the book's readers. Suffice it to say here that Mepham does establish that the major books of the period 'had an origin which was both "respectable" and "academic"'.

As if all this were not enough, Mepham adds a lengthy glossary of terms, in which most of the entries include quotations from Scottish book-keeping texts and other sources. A detailed index is helpfully provided as well.

Mepham has done for the Scottish literature on accounting up to 1800 what has been done as successfully for only a very few other extended periods or countries. One can think, by way of comparison, only of de Waal and ten Have's books on the Netherlands, covering the sixteenth to eighteenth centuries between them. Penndorf's book on Germany peters out progressively after about 1650, though it does include what Mepham largely excludes, viz. a study of surviving account books. Italian histories tend to concentrate on the first two centuries, and Melis's treatment is of high quality. Surveys of the books on book-keeping published in England usually cover relatively short periods or are highly selective. What is needed is a 'Mepham' on the literature produced in England. It would be a daunting task, though some of the spadework has already been done.

One apparent omission in Mepham's book is any reference to influence on the Scottish authors of works published on the European continent. But it is not a real omission; for it is unlikely that by the eighteenth century books published in, say, France or Holland would have had any influence on books written in English. It seems that, by then, publications on book-keeping in each language had become largely independent of 'foreign' influences—quite unlike the situation in the sixteenth or seventeenth centuries. The reverse of this is seen in the fact that the first-rate treatises produced in Scotland seem to have had no influence outside the English-speaking world—the sole exception being that Mair's 'best-seller' text, *Book-keeping Methodiz'd*, was translated into Norwegian and published in 1775 (as Mepham notes).

It is hard for a conscientious reviewer to discover points on which to criticise the author of this book. Let me illustrate this difficulty by giving two examples I have managed to dredge up. First, the name of Sir Josiah Child, the English merchant, early economist and writer on commercial matters, is almost invariably rendered incorrectly. Second, on page 200 a view expressed by one author is said to be 'endorsed' by another: yet the author expressed the endorsing view several years before the other author's publication. But this is, clearly, unworthy scraping of the barrel; and it has been done only to show that Mepham has maintained high standards throughout a longish book packed with informative detail.

London School of Economics Basil S. Yamey

**Accounting in Socialist Countries.** *D. T. Bailey* (ed.). Routledge, 1988. 187 pp. £35.00.

A comparative study of the accounting systems in socialist countries is long overdue. As such, this book of readings is a welcome addition to the international accounting field.

The book is divided into three sections. The first three chapters provide an overview of the accounting systems in centrally planned economies. Section 2 contains seven chapters describing the accounting system in individual countries with each chapter being contributed by an authority on that particular country. Section 3 by Derek Bailey attempts to link together the material presented in the previous chapters.

The book excludes any countries in Africa and Asia. This is a shame, given the beginnings of interesting developments in such countries as Tanzania with its introduction of accounting standards that are an eclectic mix of Anglo-US standards coupled with unique features aimed at fulfilling the country's needs for information for economic and social planning.

The introduction by Bailey describes the key features of the accounting systems in Western and socialist countries. Whilst this attempts to categorise the main differences between the two systems he provides an unduly narrow definition of capitalist accounting that is inappropriate to many European countries. In particular, Bailey argues that the distinguishing feature of socialist systems is that the main objective of accounting is to feed into national economic plans. In turn this is achieved through national charts and standard formats. However, such a description could also be applied to Western accounting systems such as France.

Chapter 2 by Bailey provides an interesting description of the general features of socialist planning systems and an analysis of the roles and relative importance of accountants in western Europe and the USSR. He argues that, as state control increased, the role of accountants decreased to that of book-keepers whose function was to provide control information to feed into the upper planning echelons. Following the economic reforms of the mid-sixties with more decentralisation and control via indirect measures, accountants were not able to adapt to the need for more information and the role was instead captured by economists. This idea is further explored in Chapter 3 by Brzezin and Jaruga who describe how the role of accounting has changed over time reflecting the various ways in which the economy of the USSR has been controlled since the revolution.

Part two, the individual country studies, illustrates the diversity of accounting systems that exist in the socialist countries. Chapter 4 on Cuba concentrates upon describing the uniform chart and reports as introduced in 1977. This description concentrates upon the implementation problems especially those due to the lack of accountants. Bailey, in the second part of the chapter, widens the scope by describing the reasons for the introduction of the plan and a description of how it differs from the Soviet plan. Chapter 5 on Czechoslovakia instead describes the types of economic units in the country and the management structure and control methods used. Herzok argues that the Schmalenbach plan, which is briefly described, and was used prior to 1948, was ideally suited to the needs of socialist control. He also argues that following economic liberalisation and the use of fluctuating world prices in 1981 the system of financial reporting is broadly comparable with that in advanced capitalist countries. Unfortunately, no further information is given on the post-1980 position.

An apparent contradiction of accounting in socialist countries is that, although standardised systems were introduced to meet the needs of central planning, there has generally been no attempt to integrate the accounting system used at the micro-economic level with the needs for macro-economic information which instead relies upon statistical information. Chapter 6 on the GDR provides a description of the first attempt to integrate the two information systems. However, the evidence presented suggests that this attempt has not been a success. Instead, a two-tier system has developed with the standardised system feeding into the statistical returns for higher management alongside a more heterogeneous system developing for in-house use and as a supplement to the centralised system. Chapter 7 on Hungary instead concentrates upon describing the key features of the accounting plan, specifically its structure, how the individual parts are integrated, the accounting entries made and how output costs are determined. The specific valuation rules employed and the determination of residual income are described for Poland in Chapter 8. However, it is not possible to gauge whether these are unique to Poland especially as the first part of this chapter describes a control system that is very different from that in many other socialist countries. In particular, it describes the variety of control standards set and performance measures used that in turn indicate that organisations have considerable discretion in meeting targets and performance measures. The next chapter on the USSR again concentrates upon describing the latest chart of accounts. Discussed are, in particular, the structure of the accounts, their compilation, the expenditure classification system used and the returns produced. The final country examined is Yugoslavia. The system appears to be very different from that used in the other countries, being a two-tier system with internal reporting separated from external reporting. Given the unique industrial organisation of this country a more detailed description of the accounting system would have been valuable.

While these chapters provide interesting descriptions of various facets of accounting in the countries they describe the overall effect is rather disappointing. The main problem is one that is, perhaps, inherent in any book of readings of a comparative nature. This is that the chapters are written not only in very different styles but, more importantly, they often cover different features of the accounting and control systems in place. Thus the reader is too often left wondering to what extent the description is unique to the country being described. However, the final chapter by Bailey goes some way to rectifying this by describing some of the features that are common across the countries and highlighting some of the major differences.

According to the preface this book is aimed primarily at students of international accounting courses. There is certainly a gap in the market which this book goes quite a way to filling. However, at the price of £35 it is unlikely to be adopted on many international courses.

University of Glasgow Clare Roberts

**The Definition and Recognition of Assets.** *Malcolm C. Miller and M. Atiqul Islam.* Australian Accounting Research Foundation, 1988. viii + 134 pp. A$25.

While there is widespread awareness among British accountants of the now 'completed' US Conceptual Framework Project, such awareness does not appear to extend to the similar project of the Australian Accounting Research Foundation. This study is the seventh in a series of monographs which addresses areas of accounting theory as a part of this Australian project.

Apart from an introductory and a concluding chapter, the study consists of five chapters. Chapter 2 provides a literature survey of definitions of assets; it looks briefly at definitions in economics and law and much more fully at definitions which have been developed in the accounting literature. Chapter 3 develops the authors' own proposed definition of assets and Chapter 4 develops their criteria for the recognition of assets. Chapters 5 and 6 then attempt to apply the proposed definition of assets and recognition criteria to a number of difficult accounting issues such as executory contracts, commitments for expenditure, leases and contingencies (Chapter 5) and intangibles (Chapter 6).

At thirty-one pages, the literature survey of the definition of assets is by far the longest chapter in the book. The chapter is dominated by the survey of accounting literature covering the period 1907 to 1987. Not surprisingly it is heavily dominated by definitions developed by US authors, both individuals and professional bodies and, like most such surveys, it makes heavy reading in spite of the presentational efforts made by the authors.

The third chapter sees the development of the authors' own definition of assets, namely that 'Assets are future economic benefits expected from resources controlled by the reporting entity as a result of past events'. The similarity of this to the definitions in the FASB Statement of Financial Accounting Concept Number 6 and the IASC 'Framework for the Preparation and Presentation of Financial Statements' perhaps suggests that the expenditure of further resources on the development of additional definitions of assets is unlikely to prove fruitful at present.

Chapter 4 addresses the criteria for the recognition of assets. Although the word 'recognition' has long been a part of the technical vocabulary of US accountants, it is a relative newcomer to that of British accountants but, as the process of formally incorporating an item into the financial statements of an entity, it is undoubtedly a word with considerable potential use in the UK. The chapter briefly reviews the more sparse literature on recognition and then develops its own criteria for the recognition of an asset, that is, when, and only when:

(a) it is probable that the future economic benefits embodied in the asset will eventuate; and
(b) it possesses a relevant attribute that can be quantified in units of money with sufficient reliability.

There follows a discussion of what is meant by 'probable' and 'measurable'.

Having developed a definition of assets and criteria for their recognition, the study then applies these to a number of accounting issues. Here there is the usual problem that, even with these building blocks in place, the way in which accountants should deal with many issues is still extremely difficult to resolve. Indeed, one may be forgiven for wondering if the conclusions would have been very different in the absence of the building blocks. This is most apparent in the discussion of the accounting treatment of intangibles in Chapter 6. After discussion of the different types of intangibles and the accounting problems to which they give rise, the authors propose common rules for the treatment of all purchased intangibles. They state that, where there is no or insufficient proof of perpetual existence, intangibles should be amortised over the period during which the benefits are expected to arise. However, the study then makes the novel recommendation that, where the purchased intangibles are being effectively replaced by internally developed intangibles, such internally developed intangibles may be recognised to the extent of the amortisation charged on purchased intangibles. Effectively the debit for amortisation would be set off against the credit for the recognition of internally generated intangibles. This provides a neat way of justifying the retention of purchased intangibles at cost and it will be interesting to see if any standard setting body takes such an approach on board.

The authors are well aware that their study is only one part of the Australian conceptual framework project and that their proposals will have to be integrated with those of other studies in the series. It is undoubtedly a scholarly piece of work and, for a British reader, has the by-product of explaining Australian accounting practice on a number of issues. It does, however, appear to duplicate so much work already done in relation to the US Conceptual Framework Project.

To end on a minor point, it is a pity that such a scholarly piece of work suffers from poor proof reading in the final paragraph. This mentions the need to consider the costs and benefits of financial reporting and makes the statement that 'The cost of providing financial information should exceed the benefits to be derived from its provision'!

University of Buckingham David Pendrill

**Economic Accounting.** *Diran Bodenhorn.* Garland Publishing, 1988. iii + 326 pp. $40.

'This monograph is a throwback to an earlier era when accountants thought that they were to describe economic events and let other disciplines deal with decision making' (p. 1).

The description of economic events is, of course, a far from simple process. Diran Bodenhorn embarks upon this ambitious task (Chapter 2) by describing the extremely stylised 'Crusoe' model of a single person economy in equilibrium under conditions of certainty (an exposition which owes a great deal to Hirshleifer, whose exceptional clarity is not matched by Bodenhorn). Part II of the book (Chapters 3 to 8) derives accounting systems which, the author contends, portray economic events appropriately in such a world. This includes separate chapters on social accounting, household accounting and firm accounting and on aggregation and consolidation. Part II (Chapters 9 to 11) then leaves the stylised world of Robinson Crusoe and attempts to apply some of the accounting principles derived for that world (Chapter 8) to the real world problems of money, banks and financial institutions (Chapter 9), accounting for government (Chapter 10) and business accounting (Chapter 11).

In many ways, this is a disappointing book. The exposition tends to be idiosyncratic, with verbal arguments supported by extensive (and sometimes tedious) numerical examples, with no diagrams and little algebraic support (except in Chapter 2). Occasionally the author's assertions seem to be simply wrong, e.g. 'the 'irrelevance' of dividend policy theorem holds in the real world' (p. 194: this ignores the vast literature on the 'dividend puzzle'), or 'a world of certainty where there can be only one interest rate' (p. 196: surely, differing interest rates are due to transactions costs or market imperfections, not uncertainty). Furthermore, some of the subjects addressed seem a little arcane from the standpoint of the accountant, e.g. the extensive discussion of 'own' interest rates (Chapter 2), of whether human capital should be accounted for (Chapter 2 and Chapter 10) and of how physical production might be imputed to financial institutions (Chapter 9).

These criticisms are all symptomatic of a fundamental problem which the accountant is likely to encounter in reading this book: it is not really clear what the book is about and, in particular, whether it is about the central concerns of the accountant. The reason for this is the elusive nature of 'economic events' and the limitations of the Crusoe model in defining such events and deriving an accounting framework within which they can be described. After all, it is not clear that Robinson Crusoe, in a state of equilibrium and perfect certainty, needs accounts at all, still less a full profit and loss account and balance sheet, disaggregated into a household sector and a firm sector. The discussion which emanates from the Crusoe world deals with many issues (such as those described above as 'arcane') which relate more to social accounting than to business accounting, and it is only in the final chapter that business accounting is discussed in anything like a real world context.

Even this final chapter is constrained by the unsubstantiated assumption that real world business accounting can be improved by applying principles which would satisfy Robinson Crusoe. Thus, considerable space is devoted to discussing how historical cost-based accounting could be improved by adjusting historical costs by accrued notional interest charges (a proposal similar to that made by Anthony). It is only on p. 282 (the main text of the book ends on p. 297) that we come to the crucial statement: 'The question, therefore, must be the purpose of financial statements in the real world, where markets may be imperfect (or non-existent), and uncertainty prevails'. Having posed the question, rather too late in the book, the author gives the rather surprising answer that the financial statements are needed by shareholders not for investment purposes but for *consumption* purposes. This is justified by reference to Chapter 2, but that contained a theoretical model of the Crusoe economy in equilibrium and under conditions of certainty. It was an *assumption* of that analysis, not an *inference* of it, that Crusoe was concerned with making consumption decisions. Moreover, in a one-man economy, there was no room for shareholders, and the assumption of certainty ruled out the informational role of financial statements in resolving uncertainty. Thus, the reader is left with a profound feeling of disappointment that, at the end of a long and complex piece of theoretical analysis, the central problems relating to financial statements in the real world have not been addressed.

Nevertheless, it would be wrong to imply that this book does not have merits. Despite its possible mis-direction, the analysis is carefully and thoroughly carried out, and many insights and ideas are offered on the way. For example, there are interesting discussions of allocation and aggregation, of the relationship between the balance sheet and the profit and loss statement, and of the limitation of the matching concept. These make the book worth reading, even if the final feeling is one of disappointment.

Cambridge University Geoffrey Whittington

**Recent Accounting and Economic Developments in the Far East.** Center for International Education and Research in Accounting, Department of Accountancy, University of Illinois; 1988. 234 pp.

The Editor's Note indicates that this collection of papers, somewhat inaptly termed a 'monograph', originated as contributions to a seminar, presumably organised by the Center for International Education and Research in Accounting. However, the lack of any other information about this seminar makes it difficult to evaluate the volume in terms of its content, context and timing.

In geographical terms, the focus of the contributions is mainly on the People's Republic of China (PRC). Papers on this country account for one third of the volume, and if Hong Kong is included, the proportion rises to one half. Japan, South Korea and the ASEAN countries (Indonesia, Malaysia, the Philippines, Singapore and Thailand, but not Brunei) are also represented, but Taiwan, surely a significant Far Eastern economy, is not. Instead, there is a somewhat displaced paper on India, not usually considered part of the Far East, and not, in fact, treated as such in Needles' contribution on auditing standards in the Far East.

In terms of content, one third of the papers describe the development of the accounting and auditing profession in Hong Kong, South Korea, India and the ASEAN countries. The profession in the PRC is also covered in Zhao's paper, as one of several major accounting issues in the PRC. Various accounting subjects make up the bulk of the rest of the contributions: speculative accounting in Hong Kong (a topical and relevant subject, given the territory's reputation for freewheeling); disclosure in Japan; cultural development and management style in the PRC. Economic developments in the Far East are noticeable more for their absence, figuring only in the final, rather anecdotal paper on Japanese-US interchange.

Although the volume's title appears to be a slight misnomer on these two counts, its contents are informative and, for the most part, interesting. As in all collections of this nature, there is some unevenness in the contributions. This is due in part to the nature of the subjects covered, which range from the very general (auditing standards in the Far East) to the very specific (joint ventures in the PRC). Another reason lies with the contributors themselves: some are frank to the point of brutality (such as the very enlightening account of the development of the auditing profession in South Korea), while others are bland (notably, the paper on the profession in ASEAN countries).

Most of the contributors to this volume are academics, but they are not always from the country on which they write. This has also had an effect on the papers. A comparison between Berry's and Zhao's papers, both on the PRC, demonstrates sharply the immediacy and relevance which a local contributor brings to his subject. Even Xu's ideologically bound approach to management accounting in the PRC is informative, hinting strongly at the conflict between economic and political goals which has recently become so evident.

Not all the contributions included bibliographies, which would have been useful for readers interested in further reading. Where these were provided, the use of secondary sources in several instances was noted. Given the scope of the topics covered by the papers, some factual inaccuracies no doubt resulted. However, this reviewer only noticed one (the accountancy degree conferred by the National University of Singapore (NUS) is recognised as a professional qualification, which is not the same thing as saying that NUS administers the professional examinations (p. 76)).

A more serious criticism which must be made of the volume is that much of its content must now be outdated to a greater or lesser degree. The sources cited in some contributions are almost fifteen years old. This is not satisfactory in an area as fluid as accounting, and in a volume which purports to be about current situations. For example, the organisation of the accountancy profession in Singapore has now changed completely. More dramatically, the recent events in the PRC must lay open to question analyses based on the premise that 'the economic and political opening of the PRC to the outside world is regarded as a long-term, basic state policy' (p. 30).

These problems with gauging the continuing applicability of the information given in the various contributions could have been solved by simply making it much clearer when the papers were written. A little more editing would also have made some of the contributions more readable. However, despite its inevitable shortcomings, the volume should be of interest to both academics and professionals in different areas (financial accounting, management accounting, accounting history, auditing), and a useful addition to any collection on international accounting literature.

Nanyang Technological Institute, Singapore — Joanne Tay

**Introduction to Accounting.** *J. R. Edwards and H. J. Mellett.* Paul Chapman Publishing, 1989. xiv + 488 pp. £12.95.

The writing of an introductory textbook in accounting is no easy task. The author must decide what topics to include and exclude, and the relative emphasis to give to the topics selected. Will the book concentrate on the basic accounting records and the preparation of financial accounting statements, how much of a theoretical underpinning will it provide, will it extend to costing and management accounting, or even to financial decision making? And who is intended as the primary audience of the book: students on accounting degrees, those undergoing professional accountancy training, or non-specialists who take an accounting course as an ancillary to some other course of training or education? In practice, economic considerations usually demand some sort of compromise, so that the product is designed for several markets rather than just one. Comprehensiveness is obtained only at the price of unwieldiness.

The authors of *Introduction to Accounting* have already written good introductory textbooks for the Chartered Institute of Bankers, and the book under review is largely an adaptation and enlargement of one of these, designed not only for accounting degrees but also for professional training and A-Level courses. In fifteen chapters, the book covers the main topics of introductory financial accounting, together with an introduction to the use of accounting for decision-making and the role of computers in accounting. The exposition is generally clear and thorough. Many worked examples are provided, and a boon to the student working largely on his or her own is the wealth of questions, often drawn from professional examinations, at the end of each chapter: the text indicates the best point at which students should attempt each question, and about 20% of the book consists of very detailed answers to all the questions. (There is also an accompanying workbook, which has not been reviewed.)

It is very difficult to fault the book. The chapter on decision-making is superficial, doing little more than mention the main concepts of cost, investment appraisal methods, and forecast results (for some reason, the authors fight shy of using the word 'budget' in this context). Introductory courses that contain a substantial management accounting element will need to supplement this book with another. The chapter on computers and accounting is largely restricted to spreadsheets. Other than these reservations, however, I think that the book admirably achieves the authors' objective of providing 'an introduction to accounting which embraces both the basic techniques and the underlying theoretical concepts and shows how these are applied in various circumstances'.

The London School of Economics and Political Science — Christopher J. Napier

**Financial and Treasury Management.** *P. A. Collier, T. E. Cooke and J. J. Glynn.* Heinemann Professional Publishing, 1988. vi + 460 pp. £17.95.

Not least of the value of this CIMA sponsored publication is the range of material provided. In effect it represents a good plain man's guide to theory, accompanied by a substantial emphasis upon explanation of the organisations, functions and institutions involved in finance, which is where the balance of the book's advantage really lies.

The book is organised into six parts. The first deals with the economic and financial environment in terms of the external influence upon performance, while the second part examines ratio analysis, the interpretation of financial reports and investment appraisal. Part three concentrates on capital structure, dividend policy, portfolio theory, and the capital asset pricing model. Part 4 is specifically concerned with the functions of treasury management, embracing within that definition such varied aspects as long-term funding, small firms and their financing as well as currency risk management. The text is very well supported by a range of illustrative material, including current statistics on capital markets together with worked examples on most aspects of financial management. Despite the book's predominantly empirical orientation, theoretical chapters are also backed by generally appropriate references to the relevant research literature.

The book starts in chapter one with a traditional introduction to the separation theorem, and proceeds to a penultimate section on 'alternative views' which in one page reviews alternatives to profit maximisation. On the whole the first chapter and the book would have been better served if the final section on the structure of the book had been expanded and had been placed first. Subsequent introductory chapters provide a systematic statement of investment analysis culminating in an excellent review of portfolio theory and the capital asset pricing models. Beyond this analysis of core financial theory is relatively restricted to a ritual genuflection to Modigliani and Miller's work on both debt and dividend theory, combined into one chapter and with a succinct summary of criticism of that work.

A distinctive feature of the book is the emphasis attached to treasury management. The prominence attached to this subject in the title is reflected in chapters on, for example, the function of treasury management, and foreign currency risk management. Material on the organisational framework related to treasury management will be of particular relevance to students considering career opportunities in these areas. Other chapters deal with the functions of The Stock Exchange and long term funding, to serve as examples of a range of useful statements of current institutional practice in these areas.

Perhaps the authors' principal difficulty is their relative failure to integrate the theoretical treatment underlying the designated parts and to have made room for this within the very comprehensive description of the financial system. The logic behind one or two chapters may be debated which, while extending the range of the books coverage, constrains the scope for integrated theoretical analysis. Forecasting and the economic environment are important to any financial manager but the treatment might have been more valuable if it had been made more relevant to the main text, analysing, for example, forecasts of interest rate fluctuation with greater theoretical emphasis upon determinants of value including greater discussion of the term structure of interest rates, alternative yield curves and their significance to the corporation.

Despite these limitations this is a clearly useful book. It is particularly helpful to have accounting and financial theory linked, for example, to the treatment of currency risk and mergers and acquisitions. By design it is targeted towards students reading for the CIMA Stage 4 Management Accounting paper in which the aim is to ensure that students are able to take part in the financial management of the organisation and its activities as a whole. This helps to explain the range of subject matter tackled, extending from management buyouts to investment in short-term money markets and to financial management in the public sector. While the emphasis is predominantly upon the institutional framework, core elements of financial theory are well explained and make it well worth recommendation as a readable introductory textbook.

Aston Business School E. W. Davis

**Corporate Finance. A Model-Building Approach.** *Michel Schlosser.* Prentice Hall International, 1989. xix + 527 pp. £16.95.

This text is a first edition which introduces corporate finance by means of case study material, drawn from real business situations in international companies, and adopts a problem-solving approach with the aid of computer spreadsheets. The content covers basic financial accounting, cash models and working capital needs, discounted cash flow (including monthly and continuous discounting), risk profiles and decision diagrams, the cost of capital, capital budgeting and strategy with respect to a new product, and option pricing.

The examples are presented using Lotus 1-2-3 with some also in Multiplan and Javelin. There are useful footnotes for Excel, Quattro and Supercalc 4. It is intended that the reader use any IBM or IBM compatible PC with at least 256K of memory. The readership primarily includes of non-finance executives and business studies students. The presentation of the material is first-rate and the reader is gently led through the cases so that he or she can develop model-building skills with confidence. Overall, the content is of a very high standard and so the criticisms which follow need to be interpreted in that context.

On page 24, the author gives an example of profit estimation under the 'UK/US' method and defines 'cash flow earnings' or 'working capital provided by the operations' as sales less the cost of goods sold less expenses, including corporation tax. The term 'cash flow earnings' seems to me to be almost a contradiction in terms! The definition given is not even net operating cash flow.

On page 174 we read, 'The net present value of a strategic alternative is equal to the difference between the present value of its expected cash flows and the present value of the expected cash flows attached to a bank deposit having the same characteristics (same initial investment, same duration and same return as the one used for the calculation of the NPV'. The reference to a bank deposit seems to me to be unfortunate in view of the likely different risk perceptions by the investor comparing a bank deposit with a strategic alternative.

The discussion of the NPV and IRR approaches includes the statement that 'IRR and NPV assume that the intermediate cash flows are reinvested at the IRR or at the discount rate (NPV)'. The fallacy of this is noted by a number of authors, including Carsberg (1974). The book states 'NPV corresponds to the additional value created by the decision after the bankers and shareholders have been paid . . . Profit corresponds to the additional value created for the shareholders after banks have been paid' (p. 199). Also we read that 'when a company reports a profit in a given accounting period, this has a very clear meaning: the company has created additional value during that period'. Surely this is a highly debatable view of accounting profit!

Finally, the author states that 'If your cash flow forecasts do not incorporate inflation, then you should use a real interest rate. If, on the other hand, your cash flow forecasts reflect inflation, then a current rate is more appropriate. We recommend that you use the real-rate/constant price approach'. Such a recommendation seems to be unfortunate especially in view of the research by Carsberg and Hope (1976).

The emphasis of the book is on building financial models step by step and as such it is an excellent text for the non-finance specialist. However, the reviewer has highlighted a few minor weaknesses which could cause confusion for the finance student.

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Polytechnic South West John Pointon

**International Mergers and Acquisitions.** *Terence E. Cooke.* Basil Blackwell, 1988. 516 pp. £50.

Terry Cooke's book, written in conjunction with the accounting firm Arthur Young, is a companion to his earlier text on *Mergers and Acquisitions.* Whilst Cooke's previous book presented evidence of acquisition pitfalls, ingredients (based on empiricism) for takeover success and methods for appraisal of candidate companies, his new book moves into the global arena to study acquisition regulations in all major Western economies and some developing countries too.

The text focuses for 16 economies of the West upon corporate organisations, levels of takeover activity, controls affecting mergers, taxation rules, relevant accounting regulations and exchange control constraints. The countries covered are Australia, Canada, West Germany, France, Italy, Japan, Netherlands, Sweden, UK, USA, Argentina, Brazil, Hong Kong, Malaysia, Nigeria and South Africa.

The author's canvas is evidently a large one—with a far bigger spectrum than any other book of its kind. As such, it is undoubtedly an invaluable practical guide for directors of international companies, bankers, corporate lawyers, practising accountants and so on. The book is authoritative, well put together and the writing is good. And there is a checklist of do's and don't's in the Appendix which, in my experience, if adhered to, would have saved a good many companies an expensive embarrassment.

*International Mergers and Acquisitions* is an essential guide for practitioners—and as such it is very good indeed. Should it have a place on the finance and accounting academic's bookshelf? It is certainly indispensable to the serious specialist, whether in a business school or university, and it could be chosen as a reference text on an MBA option—although probably not as the main compulsory book.

Terry Cooke, with a little help from his Arthur Young friends, is to be congratulated on filling a real gap in the literature on practical mergers and acquisitions knowhow. No company undertaking an international strategy should overlook this book.

Cranfield School
of Management Adrian Buckley

**A History of Financial Accounting.** *John Richard Edwards.* Routledge, 1989. 326 pp. £35.

'It is intended that this book should have application as a basic text for courses on accounting history, as background reading for other accounting courses, and to appeal to any accountant who has an interest in the development of his or her discipline' (Preface).

Dick Edwards divides the development of accounting into four periods covering 4000 BC–1000 AD, 1000–1760, 1760–1830, and post-1830. Apart from a brief 'Introduction' there are four parts, entitled 'From Ancient Times to the Industrial Revolution', 'Corporate Financial Reporting Practices', 'Rules and Regulations', and 'Development of a Profession', although the chapters tend to read as a series of separate essays not corresponding with the four time periods.

Edwards admits that 'much more work is needed from accounting historians before an authoritative history can be written' (Preface). It is certainly a brave endeavour to attempt a history covering 6,000 years, even though the text is mainly confined to British history post-1830. However, he has made a valuable contribution, particularly in the post-1830 history, extending N. A. H. Stacey's *English Accountancy* (1954).

There is much to commend in the book. The utilitarian nature of accounting is stressed. Accounting practices respond to new institutional pressures, including the 'shock effect' of scandals. The author has some useful insights, for example when he distinguishes (p. 215) between financial categories, format, and valuation procedures in discussing the standardisation debates of the 1867

Watkin Committee and 1877 Lowe Committee. There is good illustrative material from British company accounts, in which Dick Edwards has done pioneering research.

However, on balance the book is disappointing. Edwards takes a dismissive view of the USA, e.g. in his view of the FASB conceptual framework project, p. 243. Moreover he makes no use of Previts and Merino's valuable source *A History of Accounting in America*, which in many ways complements his text. He also lacks a theoretical perspective, and hence tends to select his material and advance explanations in a manner which is somewhat haphazard and occasionally inaccurate. Three examples follow:

> The function of accounting statements is . . . to fill gaps in knowledge which occur, in large businesses, as the result of physically separating managers from the shop floor and shareholders from the company in which they have invested. It is for these reasons that the growth of the large limited company has been the most important single event transforming accountancy . . . (p. 91)

I agree. It is odd, therefore, that there is so little reference to available historical material (e.g. from Chandler or Hannah, each of whom receives only a single mention in the text, or Berle and Means, missing entirely) describing and analysing the growth of large managerially controlled companies, particularly in America.

It is unclear whether Edwards regards shareholders as having the power to demand financial information (pp. 142, 159, 166, 197), or as impotent victims of unscrupulous directors (pp. 19, 206, 233) who manipulate secret reserves with the support of the auditors (pp. 137–141). If, as seems plausible, there were circumstances which determined the relative powers of the parties, then this is important and interesting—but mainly glossed over in the text. In his only reference to 'agency theory' on page 142, the author seems unaware of its assumption of shareholder dominance.

As a third example, there is confusion over the timing and nature of regulation:

> Up to the Second World War accounting progressed in response to forces internal to firms; it was an evolutionary process . . . What is certain is that the position is quite different today. Because of various scandals, the involvement of regulatory bodies such as government, the stock exchange and the accountancy profession has increased significantly during the last 50 years, and the process is accelerating. (p. 16)

There are errors of analysis and of fact here. There is confusion between conditions under which companies took disclosure policy decisions on their own initiative, and those where regulators imposed disclosures upon companies generally. External regulation preceded 1939 by many years. The First World War, for instance, is scarcely mentioned at all; and taxation is dismissed in less than one page.

Similarly, important connections are touched upon at several points, but the significance overlooked. To give three examples:

(i) It is observed that prices were falling between about 1850–1900, and that this tended towards 'conservative, sometimes ultra-conservative, accounting practices' (p. 110). However, in the chapter devoted to 'Profits, Dividends and Capital Maintenance' it is nowhere noted in the discussion of nineteenth century case law that these cases were decided in the context of falling prices, so that the use of historical cost accounting rules tended to protect the creditors with whom the courts were primarily concerned. If this meant understating distributable profits, this did little to harm anyone, even the equity-owners (who still benefited from funds retained in the business). By contrast, when prices began to rise after 1900 the courts found it impossible to reverse the process and adopt any clear current value accounting rules;

(ii) There is an interesting discussion of the City of Glasgow Bank failure (pp. 144–148) leading to the 1879 Companies Act. However, a more important long-term consequence was that the clearing banks came to prefer loans to equity investments and thus never developed the close investment banking relationships which have flourished elsewhere in Europe (and Japan). The resulting gap led to new issues of equity on the stock market, arguably with disastrous results in Britain, since funds could no longer be directed knowledgeably towards their most profitable investment opportunities. For example, unlike the investment banker, the share investor has no access to information on marginal rates of return on incremental capital

(iii) An obscure footnote to page 200 refers to the fact that the 1967 Companies Act permitted partnerships to have more than 20 members. However, this fact is overlooked in Part V of the book, dealing with the 'Development of a Profession'. Without this change, the giant professional practice might not have thrived in Britain, and the profession would probably have developed quite differently.

Altogether, this is an interesting book which meets its objectives. Nevertheless, if only accounting historians in Britain had the opportunity to read for doctorates in history (better still, in economic or business history), or if we could work in partnership with such historians, we could look forward with greater confidence to the 'authoritative history' which Dick Edwards rightly seeks.

University of Lancaster Michael Mumford

**Accounting and Industrial Relations: Some Historical Evidence on Their Interaction.** *Philip D. Bougen.* Garland Publishing, 1988. 342 pp. $40.

This book is a case study based primarily on the minutes of the profit-sharing committee set up in 1920 to monitor and administer a rather unusual profit-sharing scheme devised by the management of the Manchester engineering firm of Hans Renold. Apart from chapter three which explores the inherent ambiguities in the profit sharing concept in general, the structure of the book is essentially chronological. The author begins by tracing the history of the company from its foundation by Hans Renold in 1879 to the end of the 1914–18 war, by which time his son C. G. Renold was managing director, identifying those events which seemed to have a significant impact on the development of industrial relations. The implementation and development of the profit-sharing scheme is then studied in detail from the preliminary discussions in 1920, in which management attempted to explain the nature and purpose of the scheme, through various modifications and reconstructions in response to both the trade union challenge and changes in the economic environment, to management's unilateral decision to terminate the scheme in 1930.

Since the committee remained in existence for ten years, the author has taken 'advantage of the opportunity presented by the research material to conduct a longitudinal and thematically broad overview of a specific illustration of the interaction of accounting and industrial relations'. The approach is unique in the amount of detailed analysis which the author provides in relation to the actual accounting information which was presented to the committee by management and the significance of accounting techniques adopted by management in dealing with such controversial items as depreciation, stock valuation and the 'wages of capital'.

The author emphasises the importance of studying the role of accounting information in industrial relations in context, both in relation to the external environment and the development of the perceptual fields of key participants. This is possible in the case of C. G. Renold, since his total commitment to economic efficiency through scientific management and the development of accounting techniques for control purposes is well documented. This commitment naturally led to a system of production which maximised the division of labour and minimised the opportunity for workers to gain job satisfaction or identify with the wider aims of the company. Since Renold could not reconcile this with his own humanitarian ideals, he concluded that some form of consultative forum, quite separate from the shop stewards' committee for bargaining and negotiation, was necessary to provide a structural resolution of this problem. Having failed to achieve this by setting up a welfare committee, he concluded that a profit-sharing scheme would provide a more effective mechanism to stimulate employee identification with the company. Thus the available evidence goes a long way towards explaining the factors which not only led to the emergence of the scheme, but determined the particular form which the scheme would take initially and its subsequent role in management's industrial relations strategy.

It is, however, inevitable from the nature of the evidence that many questions must remain unanswered, particularly in relation to the trade unions. Though we can see what criteria and standards were used by the employee representatives in the identification and definition of issues within the consultative forum of the profit-sharing committee, there is no way of knowing whether these differed at all within any unilateral trade union forums. The author emphasises the importance of the scheme in obtaining employee co-operation in relation to redundancies, wage reductions and changes in the production process, but it is not clear whether these changes increased or reduced the level of segmentation in the internal labour market. Nor are we told whether the segmentation of the internal labour market was reinforced by the recognition of more than one trade union for collective bargaining purposes. The minutes of the profit-sharing committee demonstrate the ability of the unions to challenge management on quite technical accounting matters, but we know nothing of the people involved and what made this possible beyond a general indication that the developing role of shop stewards may have led to a period of strong trade union identification and activity. Reference is made to the value which the worker representatives placed on receiving company information, even to the extent of wishing the scheme to continue when it became clear that managment had the ability to move the goalposts whenever a substantial bonus payment seemed likely. Yet there is no evidence presented to suggest that any of this information filtered through into the process of collective bargaining. Presumably the minutes of the shop stewards' committee which negotiated with management are no longer available.

Despite the appalling quality of the print and minor irritants such as the author's obsession with splitting infinitives, the book is well worth reading for anyone who is interested in the interactions between accounting and industrial relations. Those currently involved in devising or operating value-added bonus schemes may be surprised at the extent of the similarities in both the problems encountered by management and the issues raised by unions, but also amazed at the way that the scheme survived for so long before paying a bonus.

University of Kent at Canterbury Jacky Jackson-Cox

**Management Strategies for Information Technology.** *Michael J. Earl.* Prentice–Hall, 1989. x + 218 pp. £27.95.

This book argues that information technology (IT) is not only a support for many firms' strategies but also creates new strategic choices for them. If the promised benefits of IT, as demonstrated in classic cases like American Airlines and Reuters, are to be realised; it is vital that the planned and current use of IT is business-led. In reality this is often not the case and the book seeks to remedy this by linking the exploitation of IT to business strategy formulation and addressing information systems problems from a strategic perspective.

The introduction makes the case for strategically managing IT as a resource by contending that an 'IT era' (where IT is dependent on a range of technologies, is seen as an investment and is strategic in nature) has superseded the 'DP era' during which IT was computer based, a cost and tactically oriented. Chapter 2 considers frameworks for examining information management and derives a five point management agenda appropriate to large organisations. Crucial among these is the need to formulate an information systems strategy in which 'IT has to be seen as a strategic resource that must support business strategy and which can create strategic opportunities and competitive advantages'. Chapter 3 takes up this theme and examines fifteen frameworks which can be used by management to raise awareness of the impact of IT on the business. Adequate guidance is given on the appropriate framework for various situations: for example, positioning frameworks; scaling frameworks for assessing the importance of IT to a business; spatial frameworks to identify the character of IT applications; and temporal frameworks to assess the evolutionary position of IT in an organisation. As the author points out, the current state of research does not allow guidance on which to use and when, but the material is there to aid managers in choosing an appropriate model. The next three chapters tackle the formulation of IT strategies. This commences with the formulation of an information systems strategy (long-term, directional plan of what to do with IT), continues with the formulation of an IT strategy (the architecture which is necessary for the information systems strategy) and finishes with the information management strategy (how IT activities are to be managed). In each chapter the key strategic issues are discussed, as are alternative methodologies for formulating and linking strategies in these key areas. The next chapters discuss organising and controlling IT activities. Four levels of organising IT are analysed: the IT function; the IT department; the IT director; and the IT steering committees. It is observed that the structure of IT departments is becoming more decentralised and getting closer to the user.

In controlling IT activities the author argues that IT should be managed as an investment rather than as an expense and points out that, despite the scope provided by accounting standards, some current accounting practices in the areas of depreciation, goodwill and research and development run counter to this. The final chapter covers the ways in which organisations can make the necessary strategic changes and puts forward various change strategies before summarising in eight maxims management trends in organisations that have successfully exploited IT.

The book derives from the author's experience in two areas: research projects and management development programmes run at the Oxford Institute of Information Management; and advisory work in a number of large organisations. This background ensures first that the approach is managerial rather than technical, and second that theory and practice are successfully blended with a clear emphasis on how theoretical frameworks can assist in the formulation of strategy. The advantage of this approach is that it appeals to the widest audience, although some practitioners may find the multiplicity of frameworks confusing.

The need for guidance to management both within and without the computer function has been apparent for some time. Indeed, the 1989/90 Information Technology Review produced by Price Waterhouse characterised 1988 as a pivotal year since for the first time this survey revealed that integrating IT with corporate strategy was a top issue for computing managers. This text is perfectly timed to meet this need. It is obviously essential reading for senior management in business, corporate planners, IT professionals and their advisers and academics with an interest in corporate strategy or IT, but it should also appeal to those wishing to understand why IT as implemented has not always lived up to the extravagant claims made for it.

University of Exeter Paul Collier

**Critical Perspectives in Management Control.** *Wai Fong Chua, Tony Lowe and Tony Puxty.* Macmillan Press, 1989. x + 343 pp. £35.00

This book comprises the second volume of papers produced by the Management Control Workshop Group. The editors distinguish this volume from its predecessor by explaining that the first volume was designed to survey the existing literature in management control while this second volume is designed to provide a critical commentary on the same area. The editors express their concern that much of the management control literature presumes that the need for management control is an unproblematic given and that the agenda for discussion is therefore one of finding better ways to achieve what managers are supposed to want. In contrast, this volume contains a collection of papers that provide critiques of concept and practice from a variety of perspectives.

The text comprises 16 papers written by 18 authors. The editors themselves appear as contributing authors in almost half of the papers (7 out of 16). The papers are presented in three sections entitled 'Critique in Concept' (8 papers), 'Critique in Action' (6 papers), and 'Autocritiques' (2 papers). The autocritiques section is the smallest section, numbering 15 pages. The editors do not directly explain this structure but point to the epistemological problems of simply labelling the first two sections 'theory' and 'evidence' respectively. They make the important justification that the latter terms tend to imply a disjunction between theorising and empirical evidence whereas they wish to establish the connection and interrelatedness between the two. The last section offers two critiques of the book itself and this innovative and self critical approach is to be warmly applauded. It is an approach that other books of readings would do well to follow. The editors also provide a welcome and useful index—again a comparative rarity in edited books of readings.

The editors adopt a refreshing approach when pointing out that the authors included do not offer a consistent point of view. Instead they provide a series of papers that offer a variety of critical perspectives rather than a unitary perspective. One assertion that the editors make and which this reviewer would wish to challenge is that 'as the first paper in this collection shows, the whole phrase "management control"—at least as an area of study—arose from a broadening of management accounting'. Neither the editors nor the first paper mentioned appear to substantiate this assertion with comprehensive historical evidence and analysis. This reviewer's historical study of the development of control concepts in the management and management accounting literatures (Parker, 1986) provides evidence to the contrary.

Papers in the concept section cover such subjects as management control orthodoxy; theory development; accounting as social science; authority and accountability; power and management control; ideology, rationality and the management control process; accounting and the pursuit of social interests. Lowe and Puxty's paper on orthodoxy in management control uses a predominantly systems theory based analysis which might be accused of being as mechanistic as the classical management approach that they reject. Indeed Otley points this out in the paper that follows. The reviewer noted with interest the tendency of Lowe and Puxty to refer to a model of 'Man as Manager'—somewhat surprising terminology for these authors to use in an affirmative action and equal opportunity society. Otley's paper on theory development strategy adopts a general systems theory approach to management control systems and argues cogently for the potential of grounded theory development in integrating quantitative and qualitative approaches with the objective of securing further evidence about management control. Lowe and Tinker's paper on accounting as social science refers to the present stage of accounting development as 'an unhappy mixture of abstracted and pragmatic scientism' (p. 47). They provide an enlivening and challenging critique that bemoans the inability of the practising accounting profession to recognise the significance of accounting behaviour in its social context. This they attribute to an over-emphasis on pragmatic usefulness in accounting and argue that this emphasis does not preserve accounting neutrality but conserves the status quo and impedes change. Berry's paper on authority, accountability and accounting looks at accountability as a control process through which delegated authority is exercised. He examines alternatives to the organisational hierarchy and argues for the regulation of the boundaries of self managing groups so that accounting becomes not something done to people but with and on behalf of them. This presents itself as a return to the 'self control' concepts that were initially pioneered by Mary Parker Follett (Parker, 1984).

In discussing the relationship between power and management control, Robson and Cooper provide a paper that is commendable for its analysis of historical materialism and for its comprehensive employment of the relevant literature. Noteworthy also is their advocacy of the work of Michel Foucault, whose work is currently much in favour with critical theorists and critical historians. In their examination of ideology, rationality and the management control process, Puxty and Chua argue that concepts of rational action in organisations are rooted in ideologies. They argue that management control processes are rational technicist models that allow for inquiry into social dimensions in order to improve enterprise functioning but which do not question the fundamental framework within which an organisation operates. The final paper in this section is authored by Hopwood who continues with his recent themes of the nature of the 'accounting craft' and the relationship between 'accounting and the social'. While offering us a new and fascinating perspective of accounting in relation to social interests, this paper probably sits less easily within the book's theme of management control.

Overall, the concept papers offer a diversity of themes that are at once a strength and a weakness. Depending on the reader's objectives and point of view, their weakness may lie in their disconnected nature where no clear themes emerge since many themes are pursued. They suffer the inevitable problem of introducing huge expanses of quite different research issues at an unavoidably general level. However their strength lies in their revelation of the tremendous potential for fundamental and path breaking management control research. They offer the prospect of new developments in thought and action at both micro and macro levels while challenging the reader to rethink and reflect on the superficial assumptions and presumptions that currently govern much of management accounting thought and practice.

The action section includes papers on managerial control in the glass industry, the nursing profession, the British National Coal Board, the accounting profession, a national telephone sales organisation, and British local government. Black and Neathey conclude that the extent of de-skilling and the form of managerial control in the glass industry are a result of interaction between rational choice, historical development and continuing intra and extra-organisational negotiation. Chua's paper on the nursing profession reveals the underlying agenda of their professional body as one of exercising control in order to ensure members' survival and prosperity. To some readers this may represent a particularly broad interpretation of the conventional meaning of management control that is normally assumed by many management and accounting readers. It focuses on the management and control of experts and expertise by their peers and really falls within the scope of the established sociological literature on professions and their self-control (Elliott, 1973; Tuohy, 1976; Portwood and Fielding, 1981). The paper by Capps *et al.* provides a further exposition of the group's by now well known National Coal Board study. It illustrates how accounting systems influence and are influenced by behaviour in organisations and provides a fascinating explication of the relationship between social and behavioural patterns and mining performance measures. Their observations on the lead up to and the eventual possible effects of the bitter 1984/85 coal mining dispute in the UK might nonetheless not come as too much of a surprise to many readers.

Cooper *et al.*'s paper on the accounting profession, corporatism and the State appears to be marginally relevant to the text's management control theme. The authors admit this but provide an innovative justification and a nonetheless interesting paper. Authority or domination as a basis for control is considered by Roberts who analyses their shortcomings and argues for the importance of the way in which control is exercised and the potential of the self-control concept as an alternative basis for control. While offering itself as a very useful analysis, the analysis itself is not new and such expositions can be found in the management literature dating all the way back to Mary Parker Follet (Parker, 1984). The paper by Rosenberg provides a fascinating account of treasurers and politics in UK local governments. However, in form and content, this paper appears to be of a totally different style from the rest of the papers in the text. It uses no headings, a different referencing system, and does not clearly state its objectives but launches into a detailed case discussion at the very outset of the paper. In summary the action section papers provide us with a mixed bag in terms of their focus and the breadth of their interpretation of what constitutes management control. The exposition by Black and Neathey and by Capps *et al.* are particularly valuable in this reviewer's opinion.

The autocritiques section is a most useful innovation with the two papers by Maunders and Willmott offering quite unique and differing approaches to their review of the preceding material. Nevertheless they are very valuable in providing the reader with a 'third party' perspective, and in doing so they encourage the reader to 'stand back' from the material in order better to assimilate its implications.

All in all this is a fascinating and challenging text. It challenges the conventional wisdom in the arena of management control through the pursuit of dialogue and difference. We are treated to a cross-section of perspectives from the radical to the behavioural to the systems; from the macro-professional to the micro-organisational; and from capitalist class to holistic organisational. For the researcher and advanced student of management and accounting it offers compelling reading.

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The Flinders University of South Australia

Lee D. Parker

**Financial Reporting to Employees.** *Lee D. Parker (ed.)*. Garland Publishing, 1988. xviii-247 pp. $35.

This is a fascinating book for anyone who has been, or is, concerned with the accounting and industrial relations interface. It consists of an edited selection of articles on the general theme of disclosure of information to employees. It grew out of, and starts with, the 1984 *AOS* article by Lewis, Parker and Sutcliffe which sought to correlate and explain the historical pattern of interest in disclosure to employees, with numbers of publications per year as the dependent variable. From the literature search which had to be conducted in this research, Parker has selected 31 papers for reproduction, which illustrate the literature over the period 1919 to 1979. These are classified under the groupings: Early Stirrings; Reporting Rationales; Reporting Methods; Reporting Practices; Case Studies and Surveys; Assessing Employee Interest; and Reporting in an Industrial Relations Context. It is some indication of the quality of the selections that, despite a long-standing research interest in the field, this reviewer had only read 7 out of the 32 papers previously despite finding something noteworthy in all of them.

As Parker notes in his editorial comments which precede each section, a great number of re-inventions of the wheel appear to have taken place in each resurgence of interest in employee reporting, due to apparent ignorance of the fact that there was any earlier literature. With this collection, there should be no excuse next time! Geoffrey Holmes, in one reproduced paper (1977), states, for example:

> Many British companies now report as a matter of routine to their employees. This is a comparatively new phenomenon. If one places a date on it, and says that it all began in the last five or six years, someone will undoubtedly write to *The Times* suggesting that he heard the cuckoo long before that. Nevertheless, it *is* a comparatively new idea, and one which is growing in popularity and importance.

In contrast, writing admittedly from American experience, another reproduced paper, by James W. Irwin (1939), states:

> It will be recalled that last spring, spreading with the speed of the miniature golf fad of 1929, employee financial reports became epidemic.

The earliest papers on reporting to employees reproduced in this selection are from 1923, though there is evidence of interest in the subject from this side of the Atlantic from the 1890s as a by-product of profit-sharing schemes (Hussey and Morris, 1987). Maybe even earlier papers would indicate that some 'modern' ideas had precedents last century, but I am satisfied enough with the potentially rich source of surprising references which can be mined from this book. For instance, Eakin (1938) presents statements of value added and its distribution for US Steel (1928 to 1936) and the Johns-Manville Company (1937?) which, with slight modifications, would probably satisfy the authors of *The Corporate Report* (1975).

Issues of optimal simplification, the medium of publication, effective communication and distribution can all be seen to have been discussed and experimented with pre-war, so that, as Parker points out:

> This collection of papers provides an example of the quite advanced stage of development that thinking and practice on employee report content, presentation, and dissemination had reached during the 1940s in particular. The majority of issues still being discussed and employed in the 1970s and 1980s had to all intents and purposes been fairly thoroughly canvassed decades earlier.

So what is new? To me, the outstanding difference between early and later writers in the field lies in willingness of early writers to adopt an unequivocally managerialist approach. For example, Botsford (1923) states that 'During the industrial depression more than one plant paper justified a wage cut to such an extent that the workers accepted that cut without a whimper, believing that the economic situation demanded it. This is itself a tremendous achievement and (same paper): 'Plant publications have discouraged radicalism to a large extent'. I should think that Ogden and Bougen (1985) would have been more than grateful had such quotations been available to them to support their thesis on the managerial advantages of disclosure to employees and unions!

I found the selection of papers on reporting in an industrial relations context (i.e. to unions) less useful than the rest—perhaps because I had read them all before—and could not see much point in the inclusion of the Cooper and Essex (1977) article from *AOS*, which is readily available, unlike most of the earlier material.

As a general point, it is easy to see from this selection why the editor should have been led to the thesis that there have been a series of peaks in the Anglo-Saxon literature which in turn reflect practice and the behaviour of certain explanatory variables. The reader should note, however, that Hussey and Morris (1987) have produced a plausible competing statistical analysis, whilst further sociological theory is available which could provide alternative (or complementary) explanations for these peaks (Ramsay, 1977).

## References

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University of Leeds K. T. Maunders

**Dealing in Traded Options.** *Richard Hexton.* Prentice Hall, 1989. xiii + 192 pp. £25.

In this curate's egg of a book, Richard Hexton passes on some accumulated wisdom as a player, analyst and observer in the London Traded Options Market. The book is explicitly aimed at educating the private investor about the LTOM's products, mechanisms and potential for gain. It does not pretend to analyse the theory of workings of the market from an academic standpoint. As such, it will appeal to practitioner readers of ABR, who are faced with clients who know little of options, but are themselves excluded by the market's mystique and jargon.

The book deals well with purpose and mechanisms, with ample examples, though these are at times afflicted by misprints—250p for 25p a crucial point on page 14, for example. Some headings are puzzling: why are columns of exercise prices continually headlined as 'Premiums' in the tables? The glossary, also, should have been still more ample, with many terms still left to a beginner's imagination.

There are long sections explaining the mechanics of technical analysis of stock and index movements, which is this author's area of concentration (and income), and which he sees as the key to profitable options trading: a market where transient inefficiencies in pricing are magnified and can, with forethought, be exploited. Chapter 4, in its counterpoint of technical (or chartist) versus fundamentalist approaches, errs perhaps too heavily to the technical: perturbations from history are only relevant if they are underpinned by changes in fundamental values. Otherwise, technical analysis points only to aberrant investor psychology. This chapter repeats the false debate between two groups of market analysts, both reading runes, but according to different traditions.

Hexton's book perpetuates some myths, while demystifying other areas. The jacket (and preface) promise investors that '[options] can generate huge profits—irrespective of market trends'. This catches attention, but hardly encapsulates the decision processes involved, smacking of the hoary holy grail of riskless profits. In particular, too little attention is given in the book to the balance of (potential) gains against the option purchaser's committal of p[illegible]ent premiums and their financing costs.

Technically, Hexton could have usefully developed the distinction of 'intrinsic' and 'time' components in options' values, to clarify for investors the nature of the risk:return tradeoffs being purchased and sold. This would have helped, too, in clarifying the interest of the mechanistic valuation approach: the Black-Scholes 'fair' or imputed price formula, and its relationship to market premia.

It is hard to see how the private investor, handicapped by delays in information, decision, and execution of deals, would gain much from heavy investment in becoming an effective options market player: computer hardware and software, the Hexton training course (plus, perhaps, another to balance the anticipated benefits with the costs of dealing), the Hexton information service, the time invested in analysis and decision to get the crucial timing correct. In a book published in 1989, it is hard, also, to see why there is no discussion of the great recent or contemporary issue in timing and technical analysis: October 1987 attracts the briefest of allusions, its impact upon options strategy or investment is never addressed, and all statistics stop conveniently at September 1987.

In summary, this is a useful book for its audience, showing the skills and experience of its author, and drawing attention to the growth of, and potential for, investors in options trading; but one where the promise of the examples—so many gains here, so few losses on unsuccessful forays—should be treated with caution.

Aston Business School Roger Buckland

**Accounting from the Outside.** *Anthony G. Hopwood.* Garland Publishing, 1988. xxxiii + 609 pp. $75.

At the time when Anthony Hopwood and I entered the world of academic accounting to pursue our somewhat different interests and career paths, that world was substantially different from the current state of positivists vs normativists, UFC ratings based on secret criteria, etc. Much has changed in a short time, and this volume of Hopwood's work tends to reflect that change.

Anthony Hopwood's writings represent what I hoped to find in academic accounting when I left practice twenty or more years ago. Intellectualism and scholarship are the main characteristics; and insatiable curiosity the main driving force. Hopwood's contribution to accounting research has been considerable, in various forms, and is to be evidenced throughout this volume.

The writings which have been reproduced are divided into a number of identified categories—accounting in use; accounting in an organisational context; accounting and the public sector; social accounting; accounting change; accounting research; and editorial views on accounting issues. As such, they represent the gradual evolution of Hopwood's thinking about accounting—from the relatively narrow view of accounting in the specific use function of performance assessment to broad historical and sociological studies of accounting change. The emphasis, however, has always been on the role of accounting within defined contexts and domains rather than with the specifics of accounting technologies.

Hopwood's research contribution has been as an observer of accounting and accountants as distinct from an active participant in the accounting world. Thus, his title for the volume—accounting from the outside. As such, his role in research is more that of an anthropologist than an accountant, and I believe his writings are as much part of the body of knowledge which is termed social anthropology as they are of accounting. Indeed, I would hope that he could be encouraged to write directly in the sociology or anthropology literatures (particularly as these relate to professions) as I feel he has much to contribute beyond the narrow confines of the body of knowledge of accounting.

Hopwood's research also reflects a further contribution to the development of the world of accounting. He is very much an internationalist, and has been associated with bringing together his fellow academics (and practitioners) in national and international conferences—especially within the context of Europe. Many of these meetings have led to published proceedings which he has helped to edit, thus assisting to disseminate the fruits of detailed conversations to a much wider audience.

The formation and editorship of *Accounting, Organizations and Society* is a further example of Hopwood's quest for suitable vehicles for bringing together academics from different locations but with similar interests. This journal has proved a remarkable success, and this ought to be stated publicly as mainly due to the editorial efforts of Hopwood, and his desire for a UK-based international journal of quality in accounting research.

One of the benefits of this volume is that it brings together Hopwood's writings from a variety of sources, many of which would have otherwise remained somewhat remote from most accounting academics. I refer specifically to the contributions he has made over the years to non-accounting texts. Indeed, apart from his individual contributions to *Accounting, Organizations and Society*, most of Hopwood's writings are contributions to edited texts.

The quality of Hopwood's thinking and writing has been consistently high. Most of it is dependent on a deep knowledge and understanding of a variety of non-accounting literatures, and most of it is empirical in the broadest sense of that word. A natural gift for written expression is a necessity for such consistency, but much must be due to the rigorous educational foundation he obtained at LSE and Chicago. And a word of comfort for those academics demoralised by the nonsense of the current UFC ratings: in my view, Hopwood's work is of international excellence in this field, but it has been achieved in a mixture of sources of publication—professional, academic, and edited text. Indeed, only two items (in 1972 and 1974) have been published in refereed US accounting journals. Thus, Hopwood proves the point that it is not where you publish that is important primarily; it is what you publish.

Hopwood is a relatively young man, and will presumably continue to research and publish. This volume is therefore an interim report. It is one which should be used by all scholars of accounting interested to have an explanation of what accounting is and is not. And my favourite reading which encapsulates such a subject? Read 'The Archaeology of Accounting Systems', *Accounting, Organizations and Society*, 1987, pp. 207–34.

This is a volume to be recommended to all entrants to the world of academic accounting. But one final thought: Hopwood bases his collection of writings on the stance of an observer of accounting from outside accounting. Given that his work is bound to shape and be shaped by the world of accounting, is he truly on the outside?

University of Edinburgh Tom Lee